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HYDRARGYRUM CUM CRETA, AND PILULÆ HYDRARGYRI.

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THESE mercurial preparations which are so valuable in consequence of their gentle, mild and manageable action, depend for their characteristic qualities upon the form in which the mercury is contained in them, and the preparations are mild and manageable just in proportion as the metal is properly comminuted, and free from oxidation.

It is quite common to hear physicians complain that they have been forced, within a few years past, to abandon the use of mercury with chalk, because it so commonly excites vomiting and gastro enteritic irritation; whereas, in the practice that has come under the personal observation of the writer, the preparation of the Pharmacopœia has never produced any such effects. The writer has therefore long coincided in the belief that these bad effects are due to the oxidation of the mercury in the short and faulty processes often adopted in preparing the medicine.

In a paper from the Editor of this Journal (Vol. 22, pp. 113. et seq.,) it was pretty clearly shown that such conclusions were correct and reasonable; and it then only remained to be determined whether these labor-saving processes were the only causes of oxidation; and to obtain some easy practical method of ascertaining the condition and quality of any given sample.

In the preparation of mercury with chalk, there are two opposite conditions equally to be avoided. When the trituration is in sufficient there is no oxidation, but the mercury remains in almost its original inert condition, although the globules may not be visible to ordinary observation even with a lens. The

surfaces of the globules become covered and hidden by the fine powder of chalk, so that though large, they are not easily seen. Such specimens, unless artificially colored, are of a very light color, and upon admixture with water afford in a moment a nearly white mixture, from the rapid subsidence of the mercury.

On the other hand, when the trituration is too long continued, the mercury becomes too finely divided, and in this condition oxidizes too rapidly and too readily, as well in the *primæ viæ* when administered, as during the process of preparation and in the keeping. In the trituration of the materials in the ordinary way no appreciable oxidation occurs until the globules become too small to be seen by the naked eye. But after this point has been passed, the rate of oxidation increases rapidly as the mercury becomes more and more divided, until finally it may be in large proportion converted into sub-oxide by oxidation from the air. The art of making a good preparation, therefore, consists in excluding the air wholly or partially during the process, and in arresting the trituration at the proper time. Very finely divided mercury oxidizes and dissolves very easily, becoming first a sub-oxide, whilst this sub-oxide in its turn is still more easily converted into per-oxide and metallic mercury. Thus the sub-oxide, which, under ordinary circumstances is among the mildest of mercurial compounds, from the instability of its chemical character is very likely to react with the vitiated secretions of cholera infantum, &c., just as Mialhe has shown that calomel sometimes does, and thus be easily converted into per-oxide and per-chloride. That this is the proper explanation of the undue activity of some samples of this preparation, is rendered almost certain by the writers' observations of the similar changes that spontaneously occur when such specimens are long kept with free access of light and air. Thus, a specimen prepared almost without contact of air, was of a very dark color, and nearly free from oxidation. At the end of a year's exposure to light in a loosely stopped bottle, it was found to contain both oxides in very notable proportion. Another portion prepared by trituration with steam power for two days and a half, by a good mechanical arrangement, but without any attempt at excluding the air, was found at the end of the trituration to contain a notable proportion of sub-oxide, but no per-oxide.

A specimen of this, which has been kept in a tall slender loosely stopped bottle of white glass, for two years and four months, now yields upon analysis a large proportion of both oxides. (See 6th analysis below.) This preparation, in its present condition, when administered to adult men in ordinary doses, still retains its proper mild character to such a degree that its action would not attract ordinary attention. But in the cases of children, especially in that class of diseases in which it is commonly prescribed, it is found to be rather too active for the indications to its use, though it does not produce vomiting at all. It is, nevertheless, undoubtedly a bad preparation, through too long trituration and bad keeping, but serves its purpose of clearly exhibiting the necessity for close attention and accurate observation in the process of preparation.

The best process for Hydrargyrum Cum Creta, as far as the writers' experience goes, is as follows:—

Introduce the mercury with a portion of the chalk into a strong bottle of double the capacity required, and shake the mixture actively as originally proposed to Dr. Coxe of New Orleans, by Mr. W. Hewson of Augusta, Ga. (See *Am. Jour. Pharmacy*, vol. 22. pp. 316 et seq.) When upon a smooth compressed surface of the powder, the mercury is no longer visible to the naked eye, it is to be well triturated with the remainder of the chalk until a fine smooth grey powder is obtained. It is then immediately put up in small vials to be well secluded from light and air.

From the fact that very few pharmacutists make these preparations, it becomes much more important to have a means of testing the character of those of the common market upon which they depend for supply, and therefore the writer has been at some pains to fix upon the following practical easy tests, which he believes to be capable of general and indiscriminate application, at the same time that they are reliable within practical limits.

The powder should be of a fine clear deep grey color, rather of the lively silver tinge, than of the dull leaden color. It should be entirely free from any rose, or "ashes of roses" tint;—and the powder should be a little cumulative or clammy, and not at all mobile or sabulous.

A little heap of it, pressed upon a dark surface with a smooth

spatula, should present no globules of mercury visible to the naked eye, and but few that are visible with an ordinary pocket lens, though looked at in all the various directions of a good light.

A small portion of the powder shaken in a test tube with a large portion of water, and then allowed to stand for half an hour, with close observation, will afford some very clear indications of quality. If the mercury is in large globules it will subside at once, and leave the chalk almost alone in suspension. This chalk then more slowly subsides and forms a stratum, the color of which indicates the proportion of mercury that may have been either finely divided or oxidized. In other cases several distinct strata may be observed, from the silvery grey of the larger globules at the bottom to the black layer of light fine oxide on top. The smaller the silvery stratum at the bottom, and the larger and more uniform the central leaden grey stratum is, the better the preparation. It is not easy to describe the indications and appearances of this simple test, but any one who will practice it two or three times will be convinced of its utility. The uniformity with which the mercury is divided, and the extent to which the trituration has been carried are best exhibited by this test.

A portion of the powder treated with dilute acetic acid in excess till all the carbonate of lime is decomposed, is then boiled, and the clear solution separated from the residue by filtration. The acetic acid dissolves both oxides of mercury and holds them in acid solution. If now a few drops of hydrochloric acid be added to the clear cold filtrate, it will decompose whatever mercurial salts are present and form corresponding chlorides with the bases. The sub-chloride being insoluble is at once precipitated, and from the quantity of this precipitate the quantity of sub-oxide is judged of. No well prepared specimen of mercury with chalk, unless all contact of air has been avoided, is ever found absolutely free from sub-oxide by this test.

Specimens badly prepared in one direction are often found entirely free from suboxide, (or other oxide,) whilst if badly prepared in the other direction, or if long kept with exposure to light or air, the precipitate with hydrochloric acid is not a mere opalescent milkiness, but it renders the liquid white and

opaque, and within a few minutes begins to subside and collect at the bottom of the test glass.

After precipitating all the suboxide as subchloride the precipitate is filtered out, and the filtrate is tested by adding ammonia in slight excess. If there has been any persalt of mercury in the original solution it will have been changed by the HCl. into soluble perchloride, and in this condition will have passed the filter. The ammonia precipitates this salt as ammoniated mercury or "white precipitate," and the proportion of this second white precipitate is indicative of the amount of peroxide in the preparation.

Now it happens that acetic acid, as well as hydrochloric, although without any appreciable action upon fluid metallic mercury, does act upon the metallic mercury in the state of subdivision in which it exists in well made mercury with chalk; but the amount oxidized and dissolved by acetic acid under the conditions of this test, is so small that it may be disregarded in the practical application of the test. It is certain, too, that in the process of dissolving the suboxide in the acetic acid, particularly in boiling the mixture, a small portion of the suboxide is decomposed into metallic mercury and peroxide, so that when the original proportion of suboxide is very small, and peroxide altogether wanting, yet the testing may indicate the presence of peroxide without any suboxide, from this cause,—a circumstance well illustrated in the third and fourth analyses, given below.

All the writer's experiments and observations, however, go to establish the fact that peroxide never occurs in these preparations, except through the condition of suboxidation as an intermediate step. The mercury is first suboxidized by the action of light and air upon it in its state of minute division, and the suboxide is then changed to peroxide by access of light and air.

The residue left undissolved by the acetic acid consists of the mercury, the insoluble impurities of the chalk, and any earthy coloring matters that may have been used. In one of the samples examined—the fifth—a large proportion of the insoluble matter looked very much like old phosphate of iron. Evaporation of the mercury from this residue at the lowest practicable temperature, from a watch glass, leaves the fixed residue to be judged by its character and proportion.

By using a weighed quantity of the powder, and by weighing the dried precipitates as subchloride, and sulphide, (rather than as ammoniated mercury,) and by distilling the mercury from the residue into alcohol, and drying and weighing it, this process is readily converted into a practically sufficient quantitative analysis. This is the method adopted in the examination of the following specimens of Hydrarg. cum Creta.

Five of the specimens were purchased at respectable central prescription stores, and the sixth is the specimen mentioned above, as having been exposed to light and air during twenty-eight months, in a narrow vial, after prolonged trituration.

The product of the officinal formula yields on analysis not 37.5 per cent. of mercury, as it should do in theory, but only about 36.9 per cent. or .6 per cent. minus. This deficiency is probably due to evaporation during the process.

SAMPLE.	PERCENTAGE OF					
	Hg.	Hg ₂ O.	Hg O.	Ca O, CO ₂	Insoluble matter.	Deficiency in Hg.
1st. Color and appearance good, - - -	32.07	0.08	0.20	63.29	4.36	14.50
2d. Color and appearance good, - - -	35.52	0.33	0.21	63.94	traces	5.30
3d. Color and appearance pretty good, -	35.44		0.05	54.79	9.72	5.5
4th. Color very light, large globules visible,	37.42		0.12	56.49	6.67	0.21
5th. Color light, greenish tinge, - - - -	28.08	0.13	0.22	60.55	11.02	25.13
6th. Color very dark, appearance good, -	34.2	1.21	1.44	63.15	traces	

The result of these examinations does not justify the conclusions at which the writer had arrived, nor does it explain the cause of the complaints so generally made by physicians, since that sample which contained most of both oxides failed to produce the bad effects complained of. The proportion in this sample is still very small, however, and nothing like what other observers have found; and, therefore, as these six specimens can scarcely represent the market upon which the complaints

are based, the writer's opinion and conclusions are in no degree changed as to the true cause of complaint being oxidation of the metal, although the examination has unexpectedly failed to establish the fact.

Six specimens of *Pilulæ Hydrargyri* were also examined qualitatively for oxides of mercury, and quantitatively for mercury, with the following results.

S A M P L E .	P E R C E N T A G E O F			
	Hg.	Hg. O.	Hg O.	Deficient in Hg.
1st. Olive color, good consistence,	30.3	traces,	traces,	9.01
2d. Good color and consistence,	33.4			
3d. Olive color, too stiff, - - -	29.1	notable proportion		13.7
4th. " " good consistence,	33.	notable proportion		1.
5th. Good color and consistence,	32.8	notable proportion		1.29
6th. Standard Laboratory prep. -	33.4			

These specimens are from the same sources as the *Hydrarg. cum Creta*; and from their examination it appears that when well made this preparation loses no mercury, neither does it oxidize any portion of it.

Whether the new form in which it is now coming into use, namely, that of "Powdered Blue Mass," will not impair its value, by subjecting it to greater risk of oxidation, is a question worthy of inquiry. The reasons for its use in such a form are stated to be its greater efficiency and certainty. If it be either more efficient or certain in this form, the circumstance may probably be explained by the fact of its being too often found materially deficient in both the quantity of mercury, and method of preparation.

NAVAL LABORATORY, New York, August, 1857.

THE ACTION OF THE ALKALINE CHLORIDES ON CALOMEL.

By ANDREW FLEMING, M. D.

The question, is calomel when combined with the chlorides of the alkalis converted wholly or in part into corrosive sublimate, changing the mild purgative into a very powerful preparation,

has occupied the attention of some few of the profession for a considerable length of time, dating, perhaps from the year 1763, "when Capallo first observed the danger arising from a mixture of calomel and sal-ammoniac."

Among those of modern date who assert that this change does take place, is found the name of Koffer, a German, who holds that he has been able to detect the alteration, and even more prominent, confirming his opinion, that of M. Mialhe, who communicated through the *Journal de Pharmacie* for February, 1840, experiments and results verifying his assertion. These experiments were conducted in the following manner: 1. 1000 parts of distilled water, 60 of common salt, 60 of sal-ammoniac, and 60 of calomel (prepared by sublimation,) which had been perfectly washed, were mixed and allowed to react for twenty-four hours, the temperature varying from 68° to 77° Fahrenheit; there was produced 0.6 of a part of corrosive sublimate. Similar experiments were made with calomel, prepared by precipitation with precisely similar results. 2. 1000 parts of the assay liquor (the alkaline chlorides just enumerated) had 60 parts of calomel, (*à la vapeur*) digested in it for twenty-four hours, at a temperature varying from 104° to 128° Fahr., and 1.5 of corrosive sublimate was produced.

A majority of medical practitioners rely upon the opinion of these gentlemen, in refusing to employ these substances in conjunction, and the authors of the different tables of incompatibles endorse their statement by directing that they ought not to be united in prescription.

Opposed to popular belief and the results of the above experiments we find that Dr. Gardner denies the assertion of M. Mialhe, that calomel is converted into corrosive sublimate by the chlorides of the alkalis, maintaining that it is merely rendered soluble by their solutions. Lepage and D'Ollegio, an Italian chemist, each from experiments made separately, also contradict the opinion of M. Mialhe, and hold: 1. That calomel when perfectly free from sublimate, digested with its own weight of hydrochlorate of ammonia, or any other alkaline chloride, in distilled water, at a temperature of from 100° to 104° of Fahrenheit, during twenty-four, thirty-six or even forty-eight hours, underwent no change of color. The filtered liquor did

not, by means of any reagent, appear to contain a trace of a mercurial salt. Some pigeons, which were made to drink of this same liquor for several successive days, suffered no inconvenience, and the calomel lost no sensible weight.

2. The same mixture exposed to a temperature of 122° to 140° Fahr., yielded a liquor which acted precisely in the same way with reagents, and on the animal economy, as the foregoing.

The results of the last mentioned experiments, while they seem to support the belief of Dr. Gardner, refute his idea, "that calomel is merely rendered soluble" by the solution of the chlorides, for if the calomel had become *soluble* by their presence, then would it have lost in weight.

The difficulty that now arises in the mind, is to know which of these assertions we are to believe, and on which of the two opinions can we rely. In conclusions so directly opposite there must be a right and wrong way, or some undiscovered cause to explain such a difference of result. In this dilemma, being desirous of possessing positive information, and without any prejudice in favor of either opinion, we resolved to examine the subject critically.

After careful trial with the formula given by M. Mialhe, we have been able to detect corrosive sublimate, in the filtered liquor, though in quantity exceedingly minute. With close observation we found that, owing to the chlorides being in so large a proportion, the precipitate yielded by some of the reagents was modified, tending to make its presence more doubtful.

Not content with this, and more thoroughly to avoid deception, we performed the following experiments viz. 1. Water two drachms, calomel (hydro-sublimed and perfectly washed) 10 grains. 2. Water two drachms, calomel 10 grains, and hydrochlorate of ammonia 60 grains. Each of these portions, was placed in shallow porcelain saucers, and allowed to remain for twenty-four hours, at the temperature of the atmosphere, ranging from 70° to 80° Fahrenheit. On examination, after the above space of time had elapsed, (evaporation having taken place to some extent,) there was found, in each instance, on the sides of the vessels, a nearly unbroken circle of pure white crystals, which, on carefully applying the test (a strong solution of iodide of potassium) in small quantity, gave unmistakable evidence of

the presence of corrosive sublimate. In repeating these experiments with the articles in question, in different proportions, we have been able to detect the formation of sublimate in the space of twelve hours.

It is scarcely worth while to remark that calomel of the same quantity with water only, treated under the same conditions of temperature and exposure, gave no trace of corrosive sublimate.

From the action of calomel and hydrochlorate of ammonia, under a great variety of circumstances, we have found that, 1. The influence of strong solar light, even at a higher temperature, impedes the formation of the bichloride. 2. When removed from solar light, elevation of temperature yielded larger quantity. 3. The quantity of sublimate produced is proportional, not to that of the calomel employed, but to that of the alkaline chlorides, thereby confirming one of the results of M. Mialhe.

The facility with which the above experiments can be performed by any one but little familiar with the tests for corrosive sublimate, places within the reach of all who have a few leisure hours an opportunity to see for themselves if we are correct; or if we are in error, in what way we have made the mistake.

From what we have seen, it is easy to imagine that similar changes may sometimes take place in the human body, when these substances are exhibited as remedial agents, and for safety it would be well, to avoid their combination, as others unobjectionable can be found to supply the place of either of them.

REMARKS ON THE IODINE-WATER OF DR. ANDERS.

By DR. EDWARD STIEREN.

[The following paper and annexed letter is inserted at the request of Dr. Stieren. It was written before the observations already published in the present volume on this subject. Assuming the results to be correct, they afford a subject for consideration to the analytical gentlemen who testified that the liquid in question contained only iodine and water.—ED. AMER. JOUR. PHARM.]

The writer of this first saw the above in New York and Philadelphia German newspapers of February, 1856, with the following lofty recommendation:

“Important discovery! The question of the solubility of

iodine in water has been finally settled by Dr. Henry Anders, for the benefit of mankind."

It was declared in those publications, "that Dr. Anders, after continued experiments, during a period of nine years, had at length succeeded in producing a chemical combination between pure water and iodine, without the addition of any other substance." The solubility of the iodine in water is not the discovery of Dr. Anders, it is not his merit; such was known as early as 1812, to the discoverer of the iodine, Mr. Courtois, of Paris, in France. The only question is, how much pure iodine can be dissolved in a certain quantity of pure water?

According to Gay-Lussac's experience, one part of iodine requires 7,000 parts of water for its solution; according to Jacquelin and others, 5,000 parts; and by my own experiments, made recently, I find that 5,600 parts of pure water are required for the solution of one part of pure iodine, at a temperature of from $+8$ to 12° R., equal to from $+50$ to 59° F. But Dr. Anders asserts that by his invention or discovery, a solution can be obtained containing $\frac{1}{4}$ of one grain of iodine in one ounce of water; that is, one part for only 640 parts of water, certainly a very remarkable difference between his estimate and the foregoing. There is no doubt that iodine may be dissolved in a less quantity of water than from 5,600 to 7,000 parts, provided the water contains sal ammoniac, or nitrate of ammonia, or the slightest quantity of iodide of potassium, or iodide of sodium, *etc.*, *etc.*; and further, with respect to the discovery of the French apothecary Dubauque, from 10 to 15 grains of iodine can be quickly dissolved in 10 ounces of water containing only a few grains of tannic acid. (See *Journal de Pharmacie*, Juillet, 1851, xx. 34.) This is a matter perfectly settled by different chemists.

The iodine water of Dr. Anders, in the advertisements, is announced in the most extravagant terms, as a cure for a host of diseases, at which we need not be surprised from our every day experience. The motive, of course, is evident. It is unnecessary for me to make any further remarks on this notable discovery, said to be *the greatest of the century*. The value and judicious use of iodine, in various diseases, without recourse to the pretended iodine water, is well known to enlightened physicians; it is another thing with a credulous and unscientific public.

I feel no other interest in this matter but that of science, and was curious to ascertain how this preparation would stand the chemical test of the proprietor in his advertisements, who invited chemists to decide on it, and offered to transmit samples of his iodine solution, in order that they might satisfy themselves of the justice of his pretensions. At my request, about ten ounces were sent me, in a bottle closed with a glass-stopper, with the note, that "every ounce of this aqueous solution contained $\frac{1}{4}$ of a grain of iodine."

The solution thus transmitted was of a brownish-yellow color, and had a smell of iodine. Now, as the solution of pure iodine in pure water must leave nothing, *at least no ponderable substances*, after evaporation, it was necessary to see whether it would stand this test.

a. For that purpose, two ounces of the solution were slowly and carefully evaporated to dryness in a small glass-retort; after this there remained a sediment of a grayish color. The retort was corked, and in the interim put aside with its contents.

b. Other four ounces of the iodine water were put into a small glass-retort, which was connected with a small glass recipient by a curved glass tube; the receiver contained a solution of two grains of caustic potassa in one ounce of water, in which one end of the glass pipe was immersed. After this, the contents in the retort were subjected to distillation until the liquid in the retort had entirely lost its odor. Having slowly evaporated the liquid of the recipient almost to dryness, in a silver crucible, a little powdered charcoal was then added and well mixed, and then nealed for a short time. The contents of the crucible, after cooling, treated with water, the solution obtained, filtered, and the filter well edulcorated. To this liquid, thus obtained, there was added nitric acid, very diluted, drop by drop, to neutralization, and then the iodine combination contained in the liquid decomposed by adding a solution of nitrate of silver. After edulcorating, exsiccating, nealing and fusing the precipitate, there was obtained two grains of iodide of silver, which is equal to 1.07736 grain of iodine, that is, 0.26934 of a grain of iodine, or a little more than $\frac{1}{4}$ of a grain to one ounce of the iodine water.

c. The sediment remaining in the retort from the evaporated

two ounces of iodine water, mentioned in experiment *b*, was treated with two drachms of water, in which it dissolved to a slightly turbid liquid; the filtered solution contained iodide of potassium.

The contents of the retort from experiment *b* being emptied into a porcelain dish, and slowly evaporated, left a grayish substance, which was soluble in alcohol at 80 per cent; the solution was somewhat turbid. The filtered spirituous solution mixed with some water, left after evaporating, three grains, which was nothing else than iodide of potassium, that is, $\frac{1}{3}$ of a grain to one ounce of the iodine water, which is equal to 0.5733 of a grain of iodine. The small remaining quantity insoluble in alcohol, contained traces of sulphuric acid, of silicic acid (silica), of lime, and of peroxide of iron.

d. Two ounces of iodine water were treated with five grains of pure caustic potassa; this solution was evaporated to dryness, and mixing a little powdered charcoal with it, was slowly nealed in a silver crucible. After cooling, the mass was treated with water, the solution being filtered; the contents of the filter, well washed, was neutralized by very diluted sulphuric acid, and then decomposed by a solution of nitrate of palladium. The iodide of palladium obtained was edulcorated, exsiccated, then weighed $2\frac{3}{8}$ grains, which is equal to 1.69228 grain of iodine, that is, equal to 0.84614 of a grain of iodine to one ounce of iodine water. If that quantity of 0.5733 of a grain of iodine, combined with potassium in one ounce of the iodine water, is subtracted from 0.84614 of a grain, then there follows 0.27284 of a grain of free iodine. And if the average will be taken, between 0.27284 and 0.26934, accounted in experiment *b*. to one ounce of the iodine water, then there results the average of 0.27109.

According to my analysis, there is found in one ounce of the iodine water 0.27109 of a grain of *free iodine*, (something more than $\frac{1}{4}$ grain), 0.5733 of a grain of *bound iodine*, forming with 0.1779 of a grain of potassium, = 0.7512 of a grain of iodide of potassium, traces of sulphuric acid, of silicic acid (silica), of lime, and of peroxide of iron.

Tarentum, Alleghany Co., Pennsylvania.

Further remarks on "Iodine Water," by Prof. Wittstein.

(Translation.)

"Dr. Edward Stieren, of Tarentum, Pennsylvania, having sent me some of Dr. Anders' iodine water, which had been received by him of Dr. Anders himself, and asserting it to be a solution of pure iodine in 960 parts of water by weight.

A careful analysis by me, of Anders' iodine water, shows that 700 parts of the same contains 1 part of iodine; but it does not appear that this portion of iodine thus contained is entirely free, but chiefly as iodide of potassium, namely: only one-fifth of free iodine, and the other four-fifths of iodide of potassium, so that 3.500 grains of the water contains 1 grain of free iodine, and 4 grains of it are combined with potassium.

A solution of pure iodine in pure water must have no ponderable substance by evaporation; but after evaporating 670 grains of Anders' iodine water, there remained 1 grain of iodide of potassium.

According to Gay-Lussac's experience, one part of iodine required 7,000 parts of water for its solution, and according to Jacquelin's experience, 5,000 parts. According to my experiments, the last approaches nearer to the truth. I have myself found that one part of pure iodine requires 5,500 parts of pure water for its solution, at a temperature of from $+10$ to 12°C .

Any one who may wish to become acquainted with my analysis of Anders' iodine water, as also with my experiments on the solubility of iodine in pure water, is referred to page 201 a. f. of the sixth volume of my Journal of Pharmacy.

DR. G. C. WITTSTEIN,

Munich, Bavaria, Jan. 3d, 1857. Prof. of Chemistry.

GLEANINGS—CHEMICAL, PHARMACEUTICAL AND MEDICAL.

Coffee as an Antidote.—Dr. Max. Langenschwarz, in a paper published in the American Medical Gazette, and republished in the Southern Medical and Surgical Journal, asserts that a tincture or decoction of raw or unburnt coffee "is one of the most important antidotes to many deadly poisons, and to a great many ordinary drugs." Among others, the following are noted

as being antidoted by coffee, viz. :—Opium, atropia and belladonna, aconite, strychnia, solania, veratria, oil of tansy, colocynth, conium, Rhus toxicodendron, mushrooms, cocculus Indicus, black hellebore, henbane, savin, ergot, bitter sweet, tobacco and nicotina, etc. Dr. L. says—"All the effects of these substances are almost instantly destroyed by administering what we call 'Tincture of raw Coffee,' or even a simple decoction of raw or green coffee, a preparation costing about nothing, and which, therefore, ought to be kept ready in every house, and in the poorest family. The following is the very simple way to get that tincture: Take a quarter of a pound of green coffee (common Domingo the best) and boil it in one quart of water till it is reduced to one pint; then put the whole (berries and liquid) in a quart bottle, add one pint of strong alcohol, and shake it from time to time a little. That's all. This tincture gets stronger from day to day, and will, if the bottle is well corked, keep for many years without changing. If to the pint of alcohol (about ten minutes before mixing it with the coffee decoction) you add a little spirit of camphor, say two tablespoonsful, you will double and triple the anti-poisonous quality of the tincture." Dr. Langenschwartz further says; "The compound saving-tincture (of green coffee and camphor) is in the respective cases of poisoning to be administered naturally and by clyster; the internal dose about ten to twelve drops in a teaspoonful of water every five minutes, and every fifteen minutes when the patient begins to recover. Larger, and even very large doses may be given if the danger of life is imminent."

The author found roasted coffee in most cases without effect. Dr. L. gives no cases, all is simple assertion;—moreover, so many violent poisons, some of which are usually considered as almost without antidotes, are alleged to be wholly controlled, and several mineral poisons like potash, phosphorus, baryta, iodine, equally counteracted, that we fear he has claimed too much power and efficiency for his counter-poison. In view of the frequent accidents with the vegetable alkaloids, and especially aconite and strychnia, the suggestion of Dr. L. is well worth trying to test the reality of its alleged power.

Dr. Marshall Hall's "Ready Method."—The instructions published by Dr. Marshall Hall for reviving asphyxiated persons

whether from drowning or other causes, has been so generally approved by the medical press that we introduce it here for the improvement of our readers:—

DR. MARSHALL HALL'S INSTRUCTIONS.—1. Treat the patient INSTANTLY, ON THE SPOT, IN THE OPEN AIR, EXPOSING the face and chest to the BREEZE (except in severe weather).

I. TO CLEAR THE THROAT.

2. Place the patient gently on the face with one WRIST under the forehead; [*all fluids and the tongue itself then fall forwards, leaving the entrance into the wind-pipe FREE.*] If there be breathing wait and WATCH; if not, or if it FAIL,—

II. TO EXCITE RESPIRATION.

3. Turn the patient well and *instantly* on his side, and—
4. Excite the nostrils with snuff, or the throat with a feather, &c., and dash cold water on the face previously rubbed warm. If there be no success, LOSE NOT A MOMENT, but INSTANTLY—

III. TO IMITATE RESPIRATION.

5. Replace the patient on his face, RAISING and supporting the chest WELL, on a folded coat or other article of dress.

6. Turn the body very GENTLY ON THE SIDE AND A LITTLE BEYOND, and then BRISKLY on the face, alternately; repeating these measures deliberately, efficiently, and perseveringly FIFTEEN times in a minute, occasionally varying the side; [*when the patient reposes on the chest, this cavity is compressed by the weight of the body, and EXPIRATION takes place; when he is turned on the side, this pressure is removed and INSPIRATION occurs*].

7. When the PRONE position is resumed, MAKE equable but efficient PRESSURE with brisk movement ALONG the back of the CHEST, removing it immediately before rotation on the side; [*the first measure augments the expiration, the second commences inspiration*].

* * THE RESULT IS—Respiration;—AND, IF NOT TOO LATE,—
LIFE!

IV. TO INDUCE CIRCULATION AND WARMTH.

8. Meantime, rub the limbs UPWARDS, with FIRM GRASPING PRESSURE, and with ENERGY, using handkerchiefs, &c. [*By this means the blood is propelled along the veins towards the heart.*]

9. Let the limbs be thus warmed and dried, and then clothed, the bystanders supplying the requisite garments.

10. AVOID THE CONTINUOUS WARM-BATH AND THE POSITION ON OR INCLINED TO THE BACK.

Syrup of Pyrophosphate of Iron.—M. E. ROBIQUET has presented to the French Academy of Medicine, a memoir on the therapeutical employment of the pyrophosphate of iron, a condensed translation of which appeared in Hay's Journal for July, 1857. The author observes—"In medicine the essential characters of a good preparation of iron are, that it should readily dissolve in the fluids of the stomach without impairing their digestive functions, that it shall be completely assimilated in the system, and that it shall not act as an astringent. The pyrophosphate of iron possesses all these properties; its resistance to solvents is the sole difficulty which remains to be overcome to entitle it to the first rank among the preparations of iron.

In studying the molecular constitution of this remarkable salt, it is easy to see that it belongs to the class of bodies endowed with the character of polymorphism. Like sulphur, phosphorus, arsenious acid, and many other polymorphous substances, pyrophosphate of iron will therefore present great differences in its chemical properties according to the process adopted in its preparation, and the temperature at which it has been obtained. By precipitating a solution of persulphate of iron with one of pyrophosphate of soda, taking care to operate at a temperature below 59° F., we obtain a gelatinous precipitate which is nothing else than pyrophosphate of iron ($\text{Fe}^2 \text{O}^3, 3\text{Ph O}^5$) dissolving with the greatest facility in a solution of pyrophosphate of soda. If the ferruginous salt were obtained at a temperature above that just mentioned, and *a fortiori*, at a boiling heat, a considerable quantity of pyrophosphate of soda would be required, and still we should obtain only an unstable solution, acquiring a black color, and having an insupportable taste. In fact, whatever precaution we take, not less than four parts of pyrophosphate of soda are required to dissolve sixteen of the gelatinous ferruginous precipitate, representing three parts of the salt dried at 212° F. When the solution is prepared in the cold it keeps for some time without change, and might be converted into a syrup which would keep tolerably well in close vessels for one or two months.

However, such a mixture contains too large a proportion of pyrophosphate of soda, which gives it a disagreeable saline taste, and does not prevent it, after a larger or shorter interval, from blackening on exposure to the air, and acquiring a more and more decided metallic taste. It was, therefore, necessary to seek for another solvent. That which I have found to succeed best is the citrate of ammonia, a salt which has the double advantage of being capable of employment in very small quantity, and of chemically concealing iron from reagents."

"The solution of pyrophosphate of iron in a citro-ammoniacal liquor keeps for whole months without undergoing any change, and yields a syrup free from the intolerable taste of ferruginous compounds. Potash, ammonia, and the alkaline carbonates do not give with pyrophosphate of iron, so dissolved, the reaction peculiar to the salt of iron."

M. Robiquet further observes, "the latent state in which it exists in this new salt, enables us to mix it with wine of bark, and to obtain from it a powerful tonic, without having to fear the blackish discoloration and inky taste, which are always produced when a salt of iron is brought into contact with fluids more or less highly charged with tannin."

"In whatever mode the citro-ammoniacal pyrophosphate of iron be administered, it has absolutely no taste, and patients not only bear it readily, but feel the best effects from its use. I have seen it particularly useful in well marked cases of anemia, chlorosis, and chronic urethritis."

M. Robiquet says, that dry pyrophosphate of iron contains 21.11 per cent. of iron, that its therapeutic qualities entitle it to the first rank among ferruginous compounds, and gives the following formula for preparing the syrup, viz.:

SYRUP OF PYROPHOSPHATE OF IRON.*

"Take of Pyrophosphate of iron two drachms and a half;

Simple Syrup twenty-nine ounces;

Syrup of Orange flowers three ounces;

make a syrup by simple solution, and color with a sufficient quantity of tincture of cochineal or alkanet. Each drachm of the syrup contains about six tenths of a grain, and a tablespoonful about three grains of the salt of iron."

* See page 404.

In making the "FERRUGINOUS WINE OF BARK," $2\frac{1}{2}$ drachms of the pyrophosphate and 77 grains of extract of pale bark are dissolved in 32 ounces of white wine.

Subcarbonate of Bismuth.—Dr. Hannon, of Brussels, (*Bull. de Therapeutique*, Feb. 15, 1857,) gives the following method of preparing this salt and of using it therapeutically: The bismuth is first purified by melting the metal in powder with ten times its weight of powdered nitre. After cooling, the metal is again powdered, and this process with nitre repeated, which frees it from arseniurets and sulphurets, which it almost always contains. One part of this bismuth is then dissolved in three parts of nitric acid, the solution evaporated to two-thirds of its bulk, and then added drop by drop to a solution of carbonate of soda, when a white subcarbonate of bismuth precipitates. The precipitate is then washed five or six times with distilled water, and lastly on a filter to remove all traces of carbonate of soda. After drying, it should be preserved in well stopped vials.

Dr. Hannon remarks that the physiological properties of the salts of bismuth are very little known, for the reason that the subnitrate is the only salt which has been employed in medicine, and the insolubility of this salt renders it inefficient in most of the cases in which it is indicated. The subcarbonate now considered is soluble in the gastric juice, its action is rapid, it produces no sensation of weight in the stomach like the subnitrate, it rarely constipates, colors the stools less than the subnitrate, and may be long employed without oppressing the stomach. The action of the subcarbonate appears to be at first sedative and subsequently excites the phenomena which result from the action of tonics.

Its therapeutical uses point to "all cases of gastralgia consecutive upon phlegmasia of the digestive passages, cases in which the tongue is red and pointed, and cases in which the digestion is laborious and accompanied with putrid and acid eructations, or in which there is a tendency to diarrhoea or spasmodic vomiting," demand the employment of subcarbonate of bismuth. This salt is also indicated "in the vomiting of children, whether caused by teething or caused by fits of indigestion, and in the diarrhoea of weak children, especially when occurring at the time of weaning."

Subcarbonate of bismuth is entirely insipid and excites no disgust. It is given before meals. Adults take it in water, and children in honey. It may be made into lozenges. The dose for adults is from 15 to 45 grains, taken three times a day in increasing doses.—*B. & F. Med. Chir. Review.*

ON SYRUP OF PYROPHOSPHATE OF IRON.

By THE EDITOR.

In the remarks on syrup of pyrophosphate of iron, from the paper of M. E. Robiquet, inserted at page 401, the reader will observe a want of clearness that leaves one in doubt in regard to the mode of making the preparation. He says that citrate of ammonia or a citro-ammoniacal liquid will dissolve the ferruginous pyrophosphate, without giving the quantity or mode of application of the solvent; and in the formula for the syrup this solvent is not even mentioned. To satisfy ourselves on this point we prepared some hydrated pyrophosphate of sesqui-oxide of iron, and found that neutral citrate of ammonia did not dissolve it; we then tried an alkaline citrate and found it successful, and now offer the following formula to such of our readers as may incline to make the preparation. The formula of Robiquet is so slightly ferruginous that it has been thought better to increase its strength to eight grains to the fluid ounce, or one grain to each teaspoonful.

Take of Pyrophosphate of soda,	120 grains.
Solution of persulphate of iron,	
Water, of each a sufficient quantity,	
Citric acid,	40 grains.
Liquor ammonia, q. s. or about	1½ fluid drachms.
Syrup of orange flowers,	2 fluid ounces.
Simple syrup,	q. s.

Dissolve the pyrophosphate in four ounces of water; add the solution of sesquioxide of iron until it ceases to precipitate; then wash the white gelatinous pyrophosphate of iron, in a filter till the washings pass tasteless. After draining, the pyrophosphate is triturated in a mortar with the citric acid previously powdered, and the ammonia gradually added, with constant stirring,

until a transparent, reddish-brown solution is obtained, avoiding much excess. This is then filtered, if necessary, mixed with the syrup of orange flowers and sufficient simple syrup to make the whole measure fourteen fluid ounces. The syrup has a slightly ammoniacal saline taste, not ferruginous, a light reddish-brown color, and may be given in teaspoonful or dessert'spoonful doses, according to circumstances, in a little water.

According to Gmelin, (Handbook, Vol. V, p. 229,) pyrophosphate of sesquioxide of iron is a sesqui-salt, having the formula of $2\text{Fe}^2\text{O}^3, 3\text{bPO}^5 + 9\text{Aq}$. Consequently it is necessary to use three equivalents of pyrophosphate of soda, $3(\text{Na}^2\text{bPO}^5)$ and two equivalents of ter-sulphate of iron, $2(\text{Fe}^2\text{O}^3, 3\text{SO}^3)$ to form one equivalent of the salt.

It may be well to remark that pyrophosphate of soda is easily made from ordinary medicinal phosphate of soda, by first drying off its water of crystallization, and then heating it to redness and fusion. The solution of persulphate of iron is made as directed in the U. S. Pharmacopœia for the purpose of precipitating hydrated sesqui-oxide of iron.

EAU DE VICHY—ARTIFICIAL VICHY WATER.

By WILLIAM PROCTER, JR.

About eighteen months ago Dr. John Bell, of Philada., (who has made the mineral waters a special study,) requested me to make for him a dozen bottles of artificial Vichy water by the formula of Soubeiran. Since then I have prepared many dozens for other persons at the instance of Dr. Bell. Finding, however, that its cost in material and trouble did not enable me to furnish it at a price to warrant its free consumption, not having command of a carbonic acid apparatus, for generating and for bottling under pressure, I suggested to Dr. Bell that he should induce Mr. Roussell, or other manufacturer of carbonic acid water, to engage in its preparation. Subsequently Dr. Bell suggested this idea to Mr. Frederick Brown of this city, who now prepares it, as I have learned, through an editorial notice in the North American Medico-Chirurgical Review.

The attention of the medical profession having thus been attracted to the artificial Vichy water, it is proper that a notice of

the preparation should appear in our columns for the information of pharmacutists who may desire to make and vend this artificial water.

According to M. Longchamps, whose analysis was adopted by Soubeiran, (*Traité de Pharm.*, 1847,) the natural Vichy water from the Grande-Grille spring, the one most usually drank by visitors, is as follows :

Carbonate of soda, crystallized,	13.592 grammes.
Carbonate of lime, . . .	0.356 "
Carbonate of magnesia, . .	0.085 "
Carbonate of iron, . . .	0.004 "
Sulphate of soda, crystallized, .	1.061 "
Water,	1000.000 "

Reasoning on the probable play of affinities M. Soubeiran constructed the following formula for preparing the water artificially, (*Traité, &c.*, page 726, tome 2d,) in which bicarbonate of soda is substituted for the carbonate and sulphate of magnesia for a part of the sulphate of soda and carbonate of magnesia, viz :—

	Grammes.		Grains.
Take of Bicarbonate of soda, . . .	8.748	=	135.
Chloride of sodium, . . .	0.167	"	2.577
Chl. of calcium, crystallized, .	0.775	"	11.961
Sulphate of soda, . . .	0.740	"	11.421
Sulphate of magnesia, . . .	0.246	"	3.796
Tartrate of iron and potassa, .	0.009	"	0.138
Water,	one litre,	pints	2.113
Carbonic acid,	five litres,	vol.	305 cu. b in.

He directs the salts of soda and the salt of iron to be dissolved in a part of the water, the sulphate of magnesia dissolved and added, and lastly the chloride of calcium in the remainder of the water, when the mixed solutions are charged with the carbonic acid gas under pressure.

The formula I have used is a slight modification of that of Soubeiran, the variation being made to get rid of small fractions, and instead of forcing gas into the solution, the salts are dissolved in the smallest possible quantity of water, put in the bottles, and then these filled with carbonic acid water.

For one dozen bottles of Vichy water.

Take of Bicarbonate of soda,	. . .	13.5 drms. (Troy.)
Chloride of sodium,	. . .	15.4 grains “
Chloride of calcium, (fused and dry)		36.0 “
Sulphate of soda, crystallized		68.5 “
Sulphate of magnesia, “		22.7 “
Tartrate of iron and potassa,		0.83 “
Water,		two pints.
Carbonic acid water,		ten pints.

Prepare twelve pint bottles with good corks. Dissolve the chloride of calcium in six fluid ounces of water and set it aside. Then dissolve the salts of soda and the salt of iron together in the remainder of the water, add the epsom salts, and when dissolved, filter. Divide this solution equally among the twelve bottles, and then having added half a fluid ounce of the solution of chloride of calcium to each, proceed to fill them with carbonic acid water (drawn quickly from the fountain,) cork securely and tie over.

On adding the chloride of calcium to the other solution a gelatinous precipitate of carbonate of lime is formed which dissolves immediately though the agency of the carbonic acid water. It is better to add the chloride as you proceed than to mix all at once, as the solution of the precipitate is rapid in proportion to its gelatinous condition.

For a Fountain of Twelve Gallons.

When made on a large scale, the following recipe may be employed to make a twelve gallon fountain.

Take of Bicarbonate of soda,	. . .	13½ ounces (Troy.)
Chloride of sodium,	. . .	123.2 grains. “
Chloride of Calcium, (fused and dry)		288.0 “ “
Sulphate of soda, crystallized,		548.0 “ “
Sulphate of magnesia, “		181.6 “ “
Tartrate of iron and potassa,	. . .	6.64 “ “
Water,	twelve gallons.

Dissolve the soda salts and the iron salt in a portion of the water filter and pour it in the fountain, then add the epsom salts previously dissolved, and lastly the chloride of calcium in the remainder of the water: The fountain is now to be charged as

in making ordinary carbonic acid water, and is then finished, and may either be sold on draught, or bottled by the apparatus used in bottling mineral waters under pressure.

Since the formula of Soubeiran was published, several analyses of Vichy water have been made which have proved its composition to be more complex than the analyses of Longchamps states it to be. The best of these is that of M. Bouquet, read to the French Academy in August 1854. He gives the composition of the water of the Grande-Grille spring as follows. The quantities of each ingredient *by weight* in a litre of 1000 grammes is as follows, viz :—

Free carbonic acid,	0.908	Sulphate of soda,	0.291
Bicarbonate of soda,	4.883	Phosphate of soda,	0.130
Bicarbonate of potassa,	0.352	Arsenate of soda,	0.002
Bicarbonate of magnesia,	0.303	Borate of soda,	traces.
Bicarbonate of strontian,	0.003	Chloride of sodium,	0.534
Bicarbonate of lime,	0.434	Silica,	0.070
Bicarbonate of protox. of iron,	0.004	Bituminous matter,	traces.
Bicarbonate of protoxide of manganese,	traces.	Total	7.914

It is thus seen that natural Vichy water contains arsenic, phosphoric, boracic, and silicic acids, besides potassa, strontia and manganese. More recently M. Nickles (*Jour. de Pharm. Juillet 1857,*) has announced the presence of fluorine, whilst other chemists have believed bromine and iodine were present. If desired, the more important of these additional ingredients might be added, and thus approach the artificial water more nearly to that of the spring; but the disproportion between the other ingredients in the two formulæ renders such additions of doubtful propriety without entirely reconstructing that for the artificial water.

CHEMICAL RESEARCHES ON AMYLENE.

By M. DUROY.

A memoir communicated to "*l'Académie Impériale de Médecine*," of Paris. Translated and abridged from *l'Union Médicale*, of April 7 and 9, 1857, by M. MORTON DOWLER, M. D., New Orleans.

Properties of Potato-Oil.

Potato-oil, which also bears the synonymes of *amylic alcohol*, the *bi-hydrate of amylene*, and the *hydrate of the oxyde of amylene*, (*fusel oel*, of the Germans,) in the form in which we

obtain it from the potato distilleries, always contains ordinary oil—to such extent, indeed, that it is not rare to find it in the proportion of fifty per cent. The potato-oil is, moreover, most generally colored, and presents a burning, penetrating and disagreeable odor which sensibly diminishes during rectification. It is of much importance to purify the potato-oil, which is used for the preparation of amylene; for without this precaution the chloride of zinc, acting on the ordinary alcohol and carbonizing the coloring matter, develops an empyreumatic product which ought to be avoided from the beginning, otherwise thus taking birth, and accompanying the amylene, it cannot be separated from it subsequently.

M. Hepp has recommended, following the process of M. Cahours, to agitate the potato-oil with water in order to remove the alcohol; but if this process has succeeded in the hands of our learned *confrère*, it must be owing to the fact of his being in possession of almost pure amylic alcohols; for, if like ourselves, he had had the misfortune to get hold of none but highly alcoholic potato-oils, he would, like us, have found that the washings, while carrying away the ordinary alcohol, would likewise carry away the fourth, the half and even the whole of the potato-oil. The water separates the alcohol, it is true, but the latter acquires immediately a great solvent power over the potato-oil. Before submitting it to washing, we should, in all cases, look to the quality of the amylic alcohol, and in view to this we here submit the parallel of character which we have observed between the pure and impure amylic alcohols:

Qualities of pure Amylic Alcohol.

Potato oil is a colorless, limpid liquid, of an oily appearance, of a strong odor; agreeable in its first impression, but afterwards nauseabund in a high degree. When its vapor is respired, asthmatic symptoms occur, which produce cough, and even vomitings. Its taste is very acid. It is inflammable, and burns with a whitish blue flame. It boils at 270° , and its sp. gr. is 0.812.

At 19° or 20° it solidifies, form-

Qualities of impure Amylic Alcohol.

The crude potato-oil is more fluid and less oily; its odor is more alcoholic and stronger, being ordinarily colored, and more inflammable than the pure oil. When it contains only one-tenth of ordinary alcohol, and an iron plate is moistened with it, it burns when brought into contact with the flame of a bougie. The oil of potato is very combustible; but it will not take fire under such condition, from the fact that its volatilization and combus-

ing crystalline scales. It stains paper, the stains disappearing some time after. It is sparingly soluble in water, to which it imparts its odor. It mixes in all proportions with alcohol, and ether and the fatty and the essential oils, etc. (Liebig).

We may add that in agitating this pure oil with water in a wide tube, it arises again to the top, and occupies the same space in the tube that it occupied at first. In the experiment, the potato-oil ought to retain its transparency, and the water itself ought to remain limpid. When an iron blade, moistened with it, is brought near the flame of a bougie, the metal, receiving a part of the heat, leaves no trace of the amylic alcohol. In order to inflame, under these circumstances, the potato oil must be at 39° to 40° of the aërometer. This test is of value only in the absence of ordinary alcohol.

tion demand a higher degree of heat than can be imparted to it in an instant on the conducting metal.

Pouring a little of this product in a glass tube containing water, and reversing the tube, after having corked it, the crude oil changes the water, in traversing it becomes opalescent, and communicates to it a milky appearance; and if the experiment be conducted in a graduated tube, and the mixture be strongly agitated, after repose it will be observed that the superincumbent oil is diminished in quantity, correspondingly with the amount of alcohol which has been dissolved.

When it contains alcohol, the latter is naturally accompanied with water; but the mixture is rapidly warmed, when a salt which has a strong attraction for water is introduced, as the dry chlorides of zinc and calcium.

Purification of Potato-Oil.

We must look to the method which possesses the greatest efficacy, and which is at the same time the least expensive. After various trials, the method of purification which has been attended with the best success in our hands, is the following: I pour the amylic alcohol in the cucurbit of an alembic, and adding four or five times its volume of water, I agitate the mixture, and luting the apparatus, I distil with a very moderate heat. At first, the resulting product is a limpid and homogeneous product, odor strongly alcoholic, and miscible with water without turbidity. Up to this the product appears to be ordinary alcohol, but soon the distillation slackens, and then the first product must be removed, and the recipient must be changed. At this second step, the distilled liquor is milky, which is a mixture of ordinary alcohol, amylic alcohol, and water; then comes the amylic alcohol almost pure, accompanied with water only; and finally, the distillation is to be arrested, when it is found that nothing passes over but

an aqueous product. The second recipient contains the amylic alcohol, which is to be separated by means of a syphon. In this state it still contains a little ordinary alcohol, so great is the affinity of the two liquids for each other. The product may now be washed without much loss; but this washing not having all the desired efficacy, unless frequently repeated, I have recourse to a second means, which has been perfectly successful, not with a view of removing the water as has been recommended, but with a view of radically separating the alcohol. I rectify on a great quantity of dry chloride of calcium, this salt having the effect of dehydrating and concentrating ordinary alcohol, and by these means giving it the property of volatilizing at a low temperature, and by this means also the alcohol passes immediately by distillation. After this, there is a marked arrest of distillation, though the heat continue the same, and the recipient is to be replaced by another vessel destined to receive the potato-oil, which, by increasing the heat, is now wholly distilled over in the desired purity.

Preparation of Amylene.

Whilst physiologists are conducting experiments with a view of studying the effects of amylene on man and animals, an uncertainty rests on the whole, from the fact that all the products employed under the name of amylene, are only multiple compounds of several carburets, and I shall hereafter show that these amylenes contain besides, sometimes ether, but up to the present time, *always amylic alcohol*. Now the main question is to determine, if we can, as an industrial process, succeed in the manufacture of amylene properly so called. If the difficulty of obtaining pure amylene should so augment the price as to render its surgical employment impracticable, and if, at the same time, it is, nevertheless, found that a mixture of amylene, paramylene, metamylenes, etc., possesses a real value, useful properties, and, in fine, is worthy of being adopted as an anæsthetic, we ought, at once, to determine the precise character of the article to be used—the quantity of absolute amylene which this compound of the hydro-carburets ought to contain. Thus we ought to determine the highest boiling point, and never to use a product leaving a residuum, on distillation, beyond this *maximum* of heat. We should seek the means of recognizing its bad qualities, and of

showing its adulterations. But most specially should pharmacutists and chemists bestir themselves with a view of furnishing a good preparation at the lowest possible price.

Apparatus.—The material composing the apparatus is a subject worthy of consideration. Glass retorts are generally used when active reagents are required; and in this view the chloride of zinc would appear to demand their employment, there being no chemical action thereby produced on the glass, and its transparency permitting ready observation. Amylene, up to the present time, has generally been prepared by means of glass vessels. I myself used them in my first trials, but I soon realized their insufficiency and inconvenience. They are not adapted to an extensive production of amylene; they required a great deal of combustible material, and from their fragility, they expose the manipulator to the occurrence of serious accidents. A distillation from glass is tedious and difficult, even when we take the greatest care to cover the arch of the retort in the most careful manner in the sand-bath, in order to retain the heat. If amylene were produced at a low temperature, and if it passed *alone* into the receiver in distillation, these inconveniencies would not exist; but as it comes over at first with its congeners, paramylene and metamylenes, these heavy vapors when at the summit of the retort, give out their latent heat, and they become condensed, and, for the most part, descend again. Meanwhile the chloride of zinc becomes concentrated, abandons a part of its water, and becomes more and more active, and it then carbonizes a part of the amylic alcohol and of the hydro-carburets, and at the same time this radical alteration imparts to the amylene a strong empyreumatic odor. I therefore now make use of a copper alembic, this metal not being acted on by the chloride of zinc. In this apparatus, which is indeed required in every laboratory, the process is conducted, at a less expense, and by its use we make a considerable step towards the reduction of the price of amylene.

PRELIMINARY EXPERIMENTS.

The action of the Chloride of Zinc, at different degrees of temperature, on Amylic Alcohol.—I. When potato-oil is agitated with the chloride of zinc coarsely broken, the mixture becomes a little heated, and on reposing, the saturated oil being separated from the excess of the salt, and mixed with a certain proportion of

water, in order to remove the chloride, there will be found after the evaporation of this water, a residuum of the chloride of zinc, of one-tenth of the weight of the oil which has been withdrawn. Thus a gramme of the concrete chloride of zinc dissolves in ten grammes of the potato-oil.

II.—A particle of the oil which has remained on a particle of the chloride of zinc, is colored in a few minutes, and before the next day a great part of the oils is carbonized; and, therefore, in the concrete and *cold* state, this salt acts strongly on the potato-oil.

III.—When the oil is impregnated with only little fragments of the dry chloride of zinc, and left to react for an hour, and if then a little water be added, the latter uniting with the chloride will immediately produce sufficient heat to disengage light bubbles, the odor of which seems to approach very nearly to that of amylene.

IV.—An oily solution, saturated with the chloride of zinc, as in the first experiment, does not become carbonized. If we shall have made such solution several days previously, the elements of the oil will now be found to have become slowly modified and disposed to give out a greater quantity of amylene by distillation. I am informed that M. Hepp has also observed the same fact.

V.—After many days preparation, I have made the distillation without adding anything to the above saturated solution. I have obtained a product which was not pure amylic alcohol, nor was it amylene, or at least there was but very little of the latter present.

VI.—Seeing that the quantity of the chloride of zinc dissolved by the amylic alcohol was not sufficient to transform it into the hydro-carburets, I introduced into the cucurbit of a little copper alembic, placed in a sand-bath, dry chloride of zinc to the amount of about the one-sixth the weight of the amylic alcohol employed. I poured on this chloride a sufficient quantity of amylic alcohol to cover it, the alcohol having previously been saturated with the chloride, and the head of the alembic being well luted and connected by means of a caoutchouc to another tube descending from a glass reservoir with a stop-cock, and which contained the remainder of the amylic alcohol. On the other side, I put a re-

ceiver of the same dimensions with the reservoir and graduated in the same manner. Moreover, certain special precautions were observed, and every thing was disposed as in M. Scottman's apparatus for the production of ether. The refrigerator was filled with ice, and the distillation was carried on by means of a slow fire.

The operation soon began, and proportionally as the liquid ascended into the receiver, I caused the fluid in the reservoir to descend into the cucurbit. The distillation went on with great rapidity, and I suspended it in a short time after exhausting the reservoir. The product separated from the water and rectified in a glass retort by means of a water-bath, was by no means pure amylene; but it was abundant. It possessed a somewhat stronger odor than that which I had procured by means of the concentrated chloride. It is very nearly identical with the amylene of Dr. Snow. In varying the proportions and the state of concentration of the chloride, I hoped that this apparatus would produce good results.

VII.—In this experiment I have followed the process of M. Hepp, which consists in mixing in a retort equal parts of amylic alcohol and the chloride of zinc at 70 degrees of the aërometer of Baumé, agitating the distilled product with an equal volume of sulphuric acid, separating the acid, and then rectifying by means of the water-bath. The boiling of this amylene commenced at $+88^{\circ}$ F. and was carried to $+147^{\circ}$ F.

VIII.—The experiment similar to the preceding, with the exclusion of sulphuric acid: The product being simply rectified by means of the water-bath at the temperature of $+140^{\circ}$ F., and agitated for a long time with one-eighth of its weight of dry chloride of zinc, and again distilled, an amylene resulted, the ebullition of which commenced at $+86^{\circ}$ F., and required at the end $+122^{\circ}$. The chloride of zinc is to be preferred, because it does not develop, like sulphuric acid, a disagreeable odor.

IX.—Dissolving in water the chloride of zinc, still impregnated with the amylene of the eighth experiment, an oily liquor came to the surface of this solution. This oil, heated in a water-bath to 100° for an hour, was not volatilized. Testing it with potash, valerianic acid was produced. *Thus amylene, rectified by the water-bath below 140° F., retains a great deal of amylic alcohol;*

but this experiment shows that the dry chloride of zinc has the property of removing this alcohol, without affecting the amylene.

These experiments go to show the difficulty, not to say impossibility of discovering a facile and inexpensive method of obtaining pure amylene. Let us examine the qualities of the amylenes in use: I have taken four different preparations, namely; 1, that of Dr. Snow (A); 2, that of M. Ménier (B); 3, that which I have prepared according to the process of M. Hepp (C); 4, the amylene obtained in the sixth experiment (D). The fixity of the boiling points, being one of the principal means of defining a liquor compound, I distilled in succession these four amylenes in a small retort provided with a thermometer. The following was the result:

Boiling of product A	began at	+ 86° F.	and closed at	+ 140° F.
" B	"	+ 84° "	"	+ 167° "
" C	"	+ 86° "	"	+ 143.6° "
" D	"	+ 88° "	"	+ 134° "

This variation in the degrees necessary to the ebullition of these products, indicates not only the presence of carburets more volatile than amylene; but, on the contrary, also the presence of bodies less volatile.

Action of Potassium on impure Amylene.—The amylene having a badly defined character may be nothing other than a mixture of the different carburets, and of amylene properly so called. In such case potassium would have no more action on them than it would have on the oil of naptha, in which it is placed for preservation. But such is not found to be their condition, the potassium oxydating in these amylenes, and giving out hydrogen gas in abundance. In order to determine the quantity given out, I have taken a little dry flask to which I adjusted a curved tube, passing it into a hydro-pneumatic receiver with a graduated scale, and I have placed successively in this flask an equal weight of the aforesaid amylenes, with a large excess of brilliant potassium cut into small pieces. The disengagement of gas was rapid in each experiment:

3 grm. of amylene A, in contact with potassium,	gave out 64 cubic centimetres of hydro. gas.
3 grm. " B, " " "	91 " "
3 grm. " C, " " "	75 " "
3 grm. " D, " " "	69 " "

The action of Potash on impure Amylene.—The oxydation of potassium, and the consequent disengagement of hydrogen, would

indicate the presence of potato-oil, and perhaps a little ether derived from the alcoholic oil; but it is especially probable that this reaction takes place between the metal and the elements of the amylic alcohol, in which is found two equivalents of water. Moreover, there is potato-oil found in it by agitating with portions of potash, which is slightly humid, and there is here soon developed the odor of valerianic acid, rendered still more sensible by the addition of sulphuric acid.

Purification of Amylene.

Knowing that the amylenes in actual use are but mixtures of amylene, the isomeric carburets and amylic alcohol, and having proven by experiment the difficulties that are to be encountered in obtaining the absolute amylene ($C^{10} H^{10}$) of M. Balard, and desiring to obtain the *type of this product*, I continued my experiments on rectification. Already it had occurred to me that at a very low temperature, with the water, both amylic alcohol obstinately passes over with the amylene, but that happily this alcohol can be separated by the chloride of zinc. I treated at several times impure amylene with this salt in its dry state, redistilling many times, and I have thus obtained a liquid which is neutral in the presence of potassium. But by the test of the thermometer, I have still realized the inconstancy of the boiling point. These repeated rectifications had caused the loss of the very volatile elements which boil between $+84^{\circ}$ and $+93^{\circ}$; and on the other hand the extreme of $+140^{\circ}$ was reduced to $+113^{\circ}$. I then obtained a fluid which boiled between 93° and 113° . I thereupon, for the last time, put the fluid in the retort, and I collected *none save the part which distilled fixed at $+95^{\circ}$* . This time I procured the pure amylene of M. Balard—but at what price! I obtained forty grammes of amylene (ten drachms) from five litres (tent pints) of amylic-alcohol! We must surely hope better things on the score of economy.

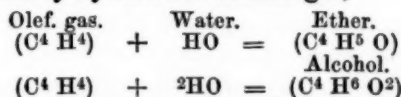
To sum up, the essential character of amylene is: 1, to boil at $+95^{\circ}$ F. fixed; 2, to possess no action on potassium, and to preserve this metal like the oil of naphtha; 3, to receive no coloring from the presence of caustic potash *even when prolonged*; 4, to give birth to no valerianic acid under the action of the hydrate of potash.—*New Orleans Medical and Surgical Journal*, July, 1857.

HYDRIDE OF AMYLE.

By T. and H. SMITH, Edinburgh.

In presenting a specimen of the new anæsthetic discovered by Professor Simpson, the hydride of amyle, and which we had the pleasure of preparing for him, it may not be out of place to make a few remarks regarding its history, chemical characters, and physical properties.

Dr. Frankland, Professor of Chemistry, Owen's College, Manchester, discovered it in the course of an investigation undertaken for another object. It had long been disputed whether ether and alcohol were merely hydrates of olefiant gas,



or whether they were constituted by the union of a compound radical ethyle ($\text{C}^4 \text{H}^5$) with oxygen ($\text{C}^4 \text{H}^5 + \text{O} = \text{C}^4 \text{H}^5 \text{O}$) in the case of ether; alcohol being merely its hydrate ($\text{C}^4 \text{H}^5 \text{O} + \text{HO} = \text{C}^4 \text{H}^6 \text{O}^2$).

This last view had been advocated strongly by Liebig, although the very existence of organic radicals remained at that time entirely hypothetical; yet Liebig expressed his conviction that the ethyle radical ($\text{C}^4 \text{H}^5$) would be obtained in a separate state.

Dr. Frankland, in entering on the interesting and able investigation of which the hydride of amyle was one of the fruits, was influenced by the desire of deciding this question by separating the radicals themselves, and more especially those of the different alcohols and their derivative ethers. The subject was undoubtedly a most difficult one, and required a clear head, profound chemical knowledge, and nice accuracy of manipulation.

Dr. Frankland began with wine alcohol, and unquestionably separated the radical ($\text{C}^4 \text{H}^5$) ethyle, but which existed as a vapor even below the zero of F. He concluded, from the much higher equivalent of amylic alcohol ($\text{C}^{10} \text{H}^{12} \text{O}^2$) and the higher density of its vapor, that the radical amyle, if he should succeed in obtaining it, would exist as a liquid at ordinary temperatures, and thus give the means of ascertaining its nature more certainly, and also give a clue to a correct understanding of the character and functions of the compound radicals in general, and more

especially of those which exist in the class of bodies called alcohols, on account of the great theoretical and practical interest belonging to them in a chemical point of view.

The method by which Dr. Frankland obtained and proved the existence of amyle, the radical of amylic alcohol, was to heat for several hours in an oil-bath iodide of amyle prepared from pure fusel oil by the simultaneous action of phosphorus and iodine on it,* in sealed glass tubes, along with granulated zinc at a heat of 190° C. (374° F.) and then distilling off the products of decomposition. The first two-thirds came off at a heat of about 80° C., and the remaining third at about 160° C. (320° F.) The first distillate on rectification proved to be a liquid boiling at about 55° C. (95° F.), and on acting upon the liquid with anhydrous sulphuric acid, he separated a carbo-hydrogen polymeric with olefiant gas ($C^{10}H^{12}$), and on then distilling the part unacted on by the acid, he obtained a liquid having the composition ($C^{10}H^{12}$), with the very low boiling point of 30° C. or 86° F., which, in place of having an unpleasant odor and tar-like taste as the mixture had, possessed, on the contrary, a grateful fruity odor, and was tasteless.

This was the hydride of amyle, whose decided and energetic anæsthetic action Dr. Simpson has just discovered.

It is a clear colourous mobile liquid, and is the lightest fluid known, having the very low density of .638 at 57° F., and a vapor density of 2.5. It is very inflammable, and burns with a brilliant white and smokeless flame. It is insoluble in water, but readily soluble in alcohol and ether. It is a very stable compound, resisting the action of fuming sulphuric acid and the most powerful oxydizing agents. Its rational formula is ($C^{10}H^{11} + H$), and therefore the hydride or hydruret of the radical amyle.

The liquid that was distilled last from the tube at a high heat

* The iodide of amyle is a colorless, transparent, heavy liquid; density 1.5. It is not readily decomposed, not changing color even when kept for a long time in diffused daylight, although the direct rays of the sun decompose it easily. It mixes readily in all proportions with oils and ointments. In consequence of this, and the large quantity of iodine—two-thirds of its weight—which it holds in a perfect state of solution, it seems to us to be worthy of attention as an outward application, and all the more that the iodine is in the most favorable condition for being absorbed.

proved to be the pure radical, and which had now been got in a separate form for the first time. This liquid is colorless and clear, of a density of .770, and boils at 155°C ., or 311°F ., and the density of its vapor is 4.9.

As Dr. Frankland found, in his previous investigations for the discovery of the radical of wine alcohol, that on exposing the iodide of ethyle with an equal bulk of water along with zinc in sealed tubes to the action of heat, the only product was the hydride of ethyle, he was led to try the same process with the iodide of amyle, and the result of the use of water in the reaction was exactly analogous. Instead of a mixture of amylene, amyle and its hydride, he now obtained as the only product of decomposition the hydride of amyle, which distilled off at a very low heat, and after digesting the liquid for twenty-four hours with caustic potash, and redistilling at 35°C ., or 95°F ., was obtained quite pure.

He also found, that by the addition of water to the iodide and zinc, the decomposition easily took place at a heat of 140°C ., or 285°F ., whilst with the iodide and zinc alone a heat of 190°C . was required, besides the necessity of amalgamating the zinc.

On proceeding to prepare the hydride for Dr. Simpson, we very soon discovered the unsuitableness of sealed tubes, as used by Dr. Frankland, for its preparation in sufficient quantity to test its powers as an anæsthetic. We therefore got much larger tubes made, and carefully annealed, of one inch internal diameter, and $\frac{5}{16}$ of an inch thick; and instead of being sealed, which necessarily involved their destruction at each operation, we had them effectually closed by accurately ground stoppers, and these again strongly fixed down in their places by a metal bridle, with a binding screw. But from the enormous pressure, not less than 300 lbs., or twenty atmospheres, by calculation, to the inch, there was extreme difficulty in getting the stoppers perfectly tight. Seeing, however, superior advantages in this plan over the other, if the stopper could be made tight, we were induced to persevere, and at length, with great care in the grinding, succeeded in making an absolutely tight tube, even under such great pressure.

But from the great risk of explosion with such size tubes, we afterwards gave up the idea of glass ones altogether. One of

these, after being exposed to the usual heat with a charge for more than an hour, burst into innumerable fragments with a tremendous explosion, breaking the thermometer and blowing out the sides of the bath, whose scalding contents were scattered about in all directions, but fortunately without doing any personal injury. This occurrence proved the necessity of adopting another plan, and we therefore thought of a copper tube, which idea, however, was nearly put aside, under the fear of a strong galvanic action being induced, and interfering with the desired action; but, on reflection, such a result seemed to be of a favorable nature rather than otherwise, and we have now found that a copper tube answers admirably—and, in fact, part of what we made for Dr. Simpson was prepared in one.

A key to the explanation of the formation of the hydride of amyle is found in the tendency of the radical amyle to combine, not only with electro-negative, but also electro-positive elements. Thus there are not only compounds like the following :—

Amyle.		Electro-negative elements.
$(C^{10} H^{11})$	+	O
$(C^{10} H^{11})$	+	Cl
$(C^{10} H^{11})$	+	Br
$(C^{10} H^{11})$	+	I ;

but also—

		Electro-positive elements.
$(C^{10} H^{11})$	+	Zn
$(C^{10} H^{11})$	+	H

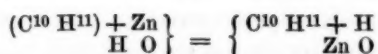
Dr. Frankland succeeded in preparing both zinc methyle, zinc ethyle, and zinc amyle. These have all an intense attraction for oxygen. In the case of zinc methyle, it equals potassium in that respect; a small glass tube, containing only a few drops of the liquid zinc methyle, actually became red-hot on being placed under water, from the great intensity of the chemical action. The zinc ethyle is a liquid of 1.18 density, boiling at $118^{\circ} C.$ or $244^{\circ} F.$, and having a vapor density of 4.25.

All these metallo-organic bodies have such an attraction for oxygen that the most extraordinary precautions are necessary in preparing and distilling them, both to get quit of every trace of water, and to exclude the presence of air by replacing it either with an atmosphere of hydrogen, nitrogen, or carbonic acid.

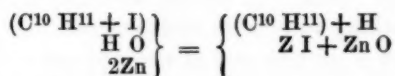
The moment one of these metallo-organic compounds comes in

contact with moisture, it is decomposed : the zinc takes the oxygen and the radical the hydrogen from an equivalent of water.

One of the methods of analysing it is indeed founded on this character : thus in the case of the amyle compound the action is as follows :—



And the production of hydride of amyle appears to be as here represented :—



Consequently, in distilling after the compulsive action of heat and great pressure, the hydride comes over, and there remains in the digester an oxyiodide of zinc.

In preparing the hydride of amyle the first step necessary is the purification of the crude fusel oil, which is a mixture of propylic ($\text{C}^6 \text{H}^8 \text{O}^2$), butylic ($\text{C}^8 \text{H}^{10} \text{O}^2$), and amylic alcohols ($\text{C}^{10} \text{H}^{12} \text{O}^2$), and of other alcohols much higher in the series ; so that the boiling, as we found, rises much higher than even 400°F . before the distillation comes to a close. As the boiling point rises from that of propylic alcohol (203°F .) to that of amylic alcohol (269°F .) it can hardly be doubted that the hydrides of the corresponding radicals would vary in their boiling points in at least an equal degree ; and as the hydride of amyle has a boiling point of 86°F ., there can be little question that the boiling points of others lower in the series would be so low, that at ordinary temperatures they would exist only as vapors. Dr. Frankland accordingly found that the hydride of ethyle ($\text{C}^4 \text{H}^6 + \text{H}$) still remained gaseous, even when submitted to twenty atmospheres of pressure.

A question here suggests itself to the mind ; may not these hydrides, existing only in vapor at ordinary temperatures, be anæsthetics themselves, and if so, may their use as such be not an altogether impractical idea ?*

From what is known of the volatile liquids got from wood and

* For instance, may not their saturated solution in alcohol, in which they are readily soluble, give a ready method of obtaining their use as anæsthetics ?

coal tars and bituminous minerals, these naturally suggest themselves as cheap and ready sources of the hydride of amyle, but from these it does not appear to us that it could be obtained in a sufficient state of purity as an anæsthetic, even though it may be found to form one of their ingredients.

Moreover, the difficulty of separating it from other ingredients, either by fractional distillation or otherwise, would be so great that success would be obtained at too costly a rate; and, after all, we fear the hydride of amyle would hardly fail to repel by the taint attaching to it from such sources.

With a view of getting quit of the expense of the iodine, which, however, can be recovered, we thought of trying the chloride in place of the iodide of amyle, but completely failed in getting the hydride from it, although the digester was subjected to the same heat as the iodide, and for double the time. On removing the preserve from the plug, after proper cooling, an escape of gas took place with a loud report, showing the presence of an uncondensable gas, most probably hydrogen; and on subjecting the contents to distillation, nothing came over till the heat reached the boiling point of the chloride, when nearly the whole of it distilled: besides, the zinc, instead of being matted together, as in the case of the iodide, by the formation of oxyiodide of zinc, was found in the tube quite loose.

In making the iodide of amyle, when the fusel oil has been nearly saturated with iodine, a solid crystalline matter separates, which becomes more abundant on the cooling of the liquid. So far as we have examined the compound, it seems to be a subiodide of phosphorus. It fumes strongly on exposure to the air, and on throwing it, after being firmly pressed in blotting paper, into a glass tube containing water, a hissing like red-hot iron in water is produced, and on applying a light to the escaping gas, it takes fire and burns with a brilliant phosphorus flame, and gives abundant white fumes of phosphoric acid, and leaves a red crust of suboxide of phosphorus (?) on the mouth of the tube. The gas appears to be phosphuretted hydrogen. The water on examination was found to contain hydriodic and phosphoric acids. Heated in a test tube it melts at a low heat and boils, giving a sublimate, which condenses in crystals nearly colorless on the sides of the tube. On applying a light to it in the open air it takes fire,

burning with a weak flame and the production of a violet colored smoke. Further investigation into its nature has meanwhile been prevented by falling short of material.—*London Phar. Jour.* June 1, 1857.

PARCHMENT-PAPER.

At a meeting of the Royal Institution, held on Friday, the 3rd of April, the subject of the discourse delivered by the Rev. J. Barlow, Vice-President and Secretary to the Institution, was "*On some modifications of woody fibre and their applications*," in the course of which an interesting description was given of the substance to which the name *Parchment-paper* has been applied. This substance is the invention of Mr. W. E. Gaine, C. E., by whom the process for its preparation has been patented. Mr. Barlow having described several of the applications of woody fibre, and particularly its application in the manufacture of paper, referred to the chemical and physical changes effected in paper and analogous fabrics by treating them with chemical agents. He contrasted with the pyroxylied textures of Kuhlmann and the gun-paper of Pelouze, the woven fabrics subjected to Mercer's process, and the *Parchment-paper*, the invention of Mr. Gaine. By acting on cloth with chloride of zinc, tin, or calcium, with sulphuric and arsenic acid, and, especially, by the caustic alkalies in the cold (the temperature sometimes being lowered to -10° Fahr.), Mr. Mercer has obtained many important effects on the fineness and general appearance of cloth, and its susceptibility of dye. This subject was brought before the Royal Institution by Dr. Lyon Playfair, C.B.,* and it has since been closely investigated by Dr. Gladstone.† Mr. Mercer also experimented on the effect of acids on paper. It being known that sulphuric acid, under certain conditions, modified vegetable fibre, Mr. Gaine instituted a course of experiments to ascertain the exact strength of acid which would produce that effect on paper which he sought, as well as the time during which the paper should be subjected to its action. He succeeded in discovering, that when paper is

* *Proceedings of the Royal Institution*, vol. i., p. 134 (1852.)

† *Journal of the Chemical Society*, vol. v., p. 17 (1853.)

exposed to a mixture of two parts of concentrated sulphuric acid (*s. g.* 1.854, or thereabouts) with one part of water, for no longer time than is taken up in drawing it through the acid, it is immediately converted into a strong, tough, skin-like material. All traces of the sulphuric acid must be instantly removed by careful washing in water. If the strength of the acid much exceeds or falls short of these limits, the paper is either charred, or else converted into dextrine. The same conversion into dextrine also ensues, if the paper be allowed to remain for many minutes in the sulphuric acid after the change in its texture has been effected.

In a little more than a second of time, a piece of porous and feeble unsized paper is thus converted into the *Parchment-paper*, a substance so strong, that a ring seven-eighths of an inch in width, and weighing no more than 23 grains, sustained 92 lbs.; a strip of parchment of the same dimensions supporting about 56 lbs. Though, like animal parchment, it absorbs water, water does not percolate through it. Though paper contracts in dimensions by this process of conversion into *Parchment-paper*, it receives no appreciable increase of weight, thus demonstrating that no sulphuric acid is either mechanically retained by it, or chemically combined with it. It has also been ascertained by analysis, that no trace of sulphur exists in the *Parchment-paper*. The fact of this paper retaining its chemical identity, constitutes an important distinction between it and the gun-papers of Pelouze and others. Unlike those substances, it is neither an electric, nor more combustible than unconverted paper of equal size and weight, nor soluble in ether or potash. Unlike common paper, it is not disintegrated by water; unlike common parchment, it is not decomposed by heat and moisture. In this remarkable operation, the action of the sulphuric acid may be classed among the phenomena ascribed to catalysis (or contact action). It is, however, conceivable that this acid does at first combine with the woody fibre, with or without the elimination of oxygen and hydrogen, as water; and that this compound is subsequently decomposed by the action of water in mass, during the washing process, the sulphuric acid being again replaced by an equivalent of water; for as has been before stated, the weight of the paper remains the same before and after its conversion. Mr. Warren de la

Rue and Dr. Müller are engaged in researches on this subject, which will be hereafter published.

Those who are interested in chemical inquiry will recall many instances of physical changes occurring in compound bodies, while these bodies retain the same elements in the same relative weights. The red iodide of mercury is readily converted by heat into its yellow modifications; yet, by the mere act of being rubbed, it is made to resume its former color. Nothing is added to or taken from this substance in the course of these changes. The inert and permanent crystals of cyanuric acid are resolved by heat into cyanic acid—a volatile liquid, characterized by its pungent and penetrating odor, and so unstable that, soon after its preparation, it changes into a substance (cyamelide) which is solid, amorphous, and destitute of all acid properties. These substances, as well as fulminic acid (which, however, is known in combination only), contain carbon, nitrogen, oxygen, and hydrogen, in the same relative proportion. But the closest analogy to the production of *Parchment-paper*, scientifically considered, is perhaps afforded by what is called “the continuous process” in etherification. It will be remembered that, in this process, sulphuric acid, at a temperature of 284° Fah., converts an unlimited quantity of alcohol into ether and water. In the first stage of this process, as explained by Williamson, it would appear that the sulphuric acid combines with the elements of ether to form sulphovinic acid; and that, in the further progress of the operation, this compound, by coming into contact with a fresh equivalent of alcohol, is, in its turn, decomposed, and resolved into ether and sulphuric acid. The ether distils over together with the water resulting from the decomposition of the alcohol; the sulphuric acid remains in the retort, ready to act on the next portion. Here, as in the case of the *Parchment-paper*, the sulphuric acid does not form a permanent constituent of the resulting substance, though it takes so important a share in its production.

The strength of this new substance before alluded to, and its indestructibility by water, indicate many uses to which it may be applied. It will probably replace to some extent vellum in bookbinding; it will furnish material for legal documents, such as policies of insurance, scrip certificates, &c.; it will take the place of ordinary paper in school-books, and other books exposed

to constant wear. Paper, after having been printed either from the surface or in intaglio, is still capable of conversion by Mr. Gaine's method; no part of the printed matter being obliterated by the process. *Parchment-paper* also promises to be of value for photographic purposes,* and also for artistic uses, in consequence of the manner in which it bears both oil and water-color. It is about to be introduced into commerce by Messrs. Thomas de la Rue and Co.—*London, Pharm. Jour. June 1, 1857.*

METHOD OF PREPARING LACTATE OF ZINC. FORMULÆ FOR ITS EMPLOYMENT.

By DR. HERPIN.

Lactate of zinc has not hitherto been used in medicine. Dr. Herpin has recently shown the advantages which may be derived from its use in the treatment of epilepsy; we shall extract from his memoir the facts relative to the preparation and properties of the salt.

Lactate of zinc may be obtained, 1st, by the saturation of lactic acid; 2nd, by double decomposition.

First Process.—Lactic acid is put in contact with pulverised zinc. The metal dissolves, and lactate of zinc is formed, with a disengagement of hydrogen. Lactic acid may likewise be saturated by oxide of zinc, or better still by the carbonate of this base, both being freshly precipitated and carefully washed. In the latter case, when once the disengagement of carbonic acid ceases, so as to saturate every trace of acid, it is boiled and filtered; on cooling, it deposits crystals of lactate of zinc.

They only require one or two crystallisations to obtain a perfectly pure product.

Second Process.—The preparation of lactate of zinc by double decomposition necessitates two distinct operations; the first consists in transforming lactate of lime into lactate of potassa; the second in putting together lactate of potassa and acetate of zinc to obtain lactate of zinc.

When a solution of lactate of lime is precipitated by carbonate of potassa, carbonate of lime is deposited and the liquor contains

* Photographs on this paper were exhibited.

lactate of potassa, which is separated by filtration. The carbonate of potassa should be in excess, and the precipitate carefully washed, so as to extract the last traces of soluble lactate. On saturating the excess of carbonate of potassa with lactic acid, we obtain by evaporation pure lactate of potassa, in deliquescent crystallised masses, soluble in alcohol. But for the preparation of lactate of zinc, it is not necessary to use so pure a product; it is only necessary to take a liquid containing at once the lactate and carbonate of lime, produced by the precipitation of the lactate of lime; by pouring it in excess, without heat, into a concentrated solution of acetate of zinc, it forms a precipitate of lactate and carbonate of zinc.

After having collected this mixture it is subjected to pressure; it is treated with distilled water, and by filtering while hot, the insoluble carbonate is easily separated from the lactate of zinc which remains in solution. The liquor is evaporated and crystallised, and the salts obtained are purified by fresh crystallisations. If we are careful in the two successive operations to use the carbonate of potassa and the lactate of the same base in excess, we shall have no reason to fear the presence of any salt of zinc besides the lactate.

The lactate of zinc is most frequently found in the form of white plates, formed by the union of small prismatic crystals of four sides, terminated by summits truncated obliquely. It is inodorous, of a slightly saccharine taste, afterwards styptic. It is sparingly soluble in water, at the ordinary temperature; in fact it requires to dissolve it, sixty times its weight of water. It is, on the contrary, very soluble in hot water, for it dissolves in six times its weight of boiling water.

Lactate of zinc is insoluble in alcohol; this property may be made available in its separation from the acetate of the same base. On treating two alcoholic solutions of lactate of potassa, and acetate of zinc with each other, we obtain instantaneously a precipitate of lactate of zinc.

The medical properties of lactate of zinc had not been ascertained, when Dr. Herpin undertook the study of this salt. The stability of composition and the solubility of this compound, have induced him to substitute lactate of zinc for the oxide, in the treatment of epilepsy.

He prescribes it in the following forms:—

1st. In powder.

Pulverised lactate of zinc . . 1 to 16 grammes.

Pulverised sugar of milk . . 5 "

Forming 20 doses—three each day.

2nd. In pills.

Pulverised lactate of zinc . . 1 to 16 grammes.

Syrup of gum q. s.

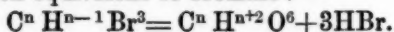
For 20 to 40 pills—three to six each day.

Chemist, June 1857, from Journ. de Pharm. et de Chimie.

ON THE ARTIFICIAL FORMATION OF GLYCERINE.

By A. WURTZ.

In a note on acetal and the glycols, the author put forward the opinion, that the processes adapted to cause the synthesis of the glycols, or diatomic alcohols, ought also to lead to the formation of the glycerines or triatomic alcohols. A glycerine is, in fact, derived from a bromide of carbonated hydrogen, $C^n H^{n-1} Br^3$, by the substitution of an equivalent of oxygen and an equivalent of water for each equivalent of bromine:—



These bromides may be prepared in various ways, and by taking advantage of the powerful affinity of bromide for silver, the above substitution may be effected.

The compound $C^6 H^5 Br^3$ may be prepared in three ways. One of these consists in treating iodide of allyle, $C^6 H^5 I$, or iodized propylene of Berthelot, with bromine. The iodized liquid is placed in a long-necked flask, surrounded by a refrigerating mixture, and one and a half times its weight of bromine is added in small quantities. The iodine separates in a crystalline form, whilst 3 equivs. of bromine are fixed upon the group $C^6 H^5$.

The tribromide thus obtained, when properly purified, forms a dense colorless liquid, which is slightly rose-colored if it retains a trace of iodine. At a temperature below $50^\circ F.$ it crystallizes in fine colorless prisms, which fuse at $61^\circ F.$ It distils unaltered at 422° – $423^\circ F.$ 205 grms. of acetate of silver were treated with 115 grms. of this tribromide, dissolved in 5 or 6 times its volume of crystallizable acetic acid. The paste thus

formed was heated for eight days on the oil-bath to a temperature of 248° – 257° F. On the conclusion of the reaction, the contents of the flask were thrown upon a filter, and the bromide of silver washed with ether.

The liquid was distilled until the thermometer marked 284° F.; the residue was treated with lime and ether. The colorless ethereal solution, when evaporated on the water-bath, left 15.5 grms. of a neutral yellowish oil. This was distilled, when a few drops only passed at 482° F., and the greater part of the liquid passed at 532° F. The perfectly colorless product is neutral, possesses a slight odor of acetic acid, and is heavier than water, at the bottom of which it forms an oily stratum. When agitated with a great excess of water, it dissolves. It is soluble in all proportions in alcohol and ether. It contains—

	Found.	$C^{18}H^{14}O^{12}$.
C	49.12	49.5
H	6.60	6.4

The formula $C^{18}H^{14}O^{12}$ is that of triacetine. The product analysed really contained 3 equivs. of acetic acid and 1 equiv. of glycerine. 0.647 gr. of the artificial triacetine were saponified by baryta-water. The liquid was freed from the excess of baryta by a current of carbonic acid and distillation, and precipitated by sulphuric acid. 0.974 gr. of sulphate of baryta was obtained, representing 2.8 or 3 equivs. of acetic acid.

To obtain artificial glycerine, triacetine was saponified by baryta-water, and the liquid freed from the excess of baryta was evaporated to dryness. The residue was treated with absolute alcohol containing a small quantity of ether. The liquid, evaporated *in vacuo*. At about 392° F. a very thick colorless liquid, of a distinctly saccharine taste, passed; it was soluble in all proportions in water and alcohol, but insoluble in ether. This liquid gave on analysis C 38.5, H 8.6. The formula $C^6H^8O^6$ requires C 39.1, H 8.6. To verify its identity with glycerine, it was treated with iodide of phosphorous, PI^2 ; a very brisk reaction took place, and iodized propylene was obtained.

The tribromide, $C^6H^5Br^3$, fusible at 61° F., and boiling at 422° to 423° F., is not identical with tribromhydrine. According to Berthelot's experiments, this is a colorless liquid, fuming slightly in the air, and distilling at about 356° F. But if the

solid tribromide gives a glyceric compound by reacting upon acetate of silver, this must be attributed to a molecular alteration taking place at the moment of the reaction.—*Comptes Rendus*, April, 1857, and *Chemical Gazette*, June, 1857.

THE MANUFACTURE, IMPURITIES, AND TESTS OF CHLOROFORM.

By EDWARD R. SQUIBB, M. D., U. S. Navy.

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The importance of an outline knowledge of the manufacture, properties, and tests of medicinal preparations, is probably not fully appreciated by the medical profession at large, and thus the chemistry and pharmacy of the *art* of medicine are gradually, but certainly, lost sight of in the rapid progress of the science.

If it be true, that the aim and object of medical progression is to improve the art of medicine in its application, then the practice of chemistry and pharmacy is as important in its bearing upon that progress as any other element. As physiology and pathology afford the light by which alone the indications and operations of vitality are seen and understood, so chemistry and pharmacy furnish the means by which these operations are modified or controlled. If scientific research and development be necessary to the successful practice of an art, the use of appropriate materials and tools is equally so. Hence it is argued that no scientific research can actively advance the practice of legitimate medicine if it does not embrace and scrutinize the materials and means by which the results are sought to be obtained.

As the demand for medicinal substances increases, the preparation of them is transferred by the physician to the dispensing pharmacist, and then by the latter to the manufacturer of chemicals on the large scale. These substances then take their places in the common market as articles of commerce, and are bought and sold with as little relation to their ultimate effects as other merchandise, while their character and quality are far less easily judged of or ascertained. Under such circumstances these substances now-a-days, deserve much more

earnest attention at the hands of those who use them. Chemistry receives but a small share of the attention of medical men; first, because it has become an abstruse, complicated, and subdivided science, whose advances are too rapid for collateral comprehension; and secondly, because the manufacture of chemicals on the large scale is supposed to have taken charge of that speciality, and to furnish the necessary scientific research and knowledge, thus relieving the physician of this important tax upon his time and intellect, and at the same time furnishing his implements in the desired quantity and condition. But it so happens that the scientific research and accumulating knowledge in all branches of manufacture are rather in the direction of large profits than improved therapeutics, and therefore, practically, the profession of medicine in tacitly relieving itself of the necessity for chemical and pharmaceutical knowledge, has suffered its materia medica to be debased, and neglected the means of check and control.

It is abundantly demonstrated by daily experience that more chemical research and labor are now required to discriminate between good and bad medicinal substances, than for the proper preparation of most of them, while many, from their character, defy all proper scrutiny. For instance, it is far easier to make medicinal hydrocyanic acid, than to ascertain the strength or purity of an unknown sample, while such substances as compound extract of colocynth can never have their value determined by examination. Again, from this want of knowledge, research, and attention on the part of the physician, it happens, as in the case of Chloroform, that simple discriminative tests follow the introduction of important substances at so long intervals that the true value of the substance is lost, or much impaired, through its undetected impurities.

Of the number of pharmacutists in the United States, the proportion of those who make their own most simple chemical preparations is very small, while of the physicians who test and examine the preparations they use, the proportion is perhaps still smaller. The physician relies upon his pharmacist, and the pharmacist relies upon the manufacturer, and thus the ultimate source of supply is not only removed beyond the confines of the profession, but beyond the reach of professional in-

fluence, except through discriminations and rejections of the articles supplied.

These are some of the prominent conditions upon which a medical skepticism, in the community and profession, is so steadily gaining ground, and therefore, the bad condition and prospects of the *materia medica* deserve the most serious attention from all medical men. Uncertainty in medicine is proverbial, and the rapid progress in the science has not had the effect of diminishing duly the force of the proverb in the community at large; for the slowly increasing confidence of the educated portions of the community is not proportionate to the advancement in knowledge and skill in the profession. In view of these circumstances, the writer would respectfully urge upon this association the importance of the question, as to how far the bad and uncertain quality of medicinal substances as now commonly used enters into this result,—and whether the modern reading of the proverbial uncertainty should not be directed against the implements of the art, rather than against the science.

In the failure of medicinal substances to fulfil the indications for their use, let the medical man more frequently call in question the character or quality of the agent than the sufficiency of the principles upon which the use was based.

With such claims upon this association for its interest and indulgence, the following matter is volunteered as information on the manufacture, properties, tests, and application of what is regarded as purely medicinal chloroform.

Forty pounds of chlorinated lime, previously made into a paste with water and passed between wooden rollers, is introduced into a forty gallon wooden still or barrel, and then diluted to the volume of fifteen gallons with water or chloroform washings. This mixture is then heated and agitated by the direct application of steam through a perforated pipe till the temperature rises to 145° . Four pints of alcohol are then blown into the mixture with the current of steam, and the heating continued till the temperature is about 145° , when the steam is shut off entirely and the mixture abandoned to its own reactions. Upon auscultating the still, a perfect vesicular murmur is heard. This increases gradually to active frothing ebullition, yielding vapors of chloroform, undecomposed alcohol, chlorine, hydrochloric, and

acetic acids, acetic ether, aldehyde, chloride of ethyl, chloral, &c. The remainder of the process, and that in which almost all the imperfections lie, has for its object the separation and condensation of the chloroform, and the utilization of the residues. The mixed vapors are passed together into a leaden vessel arranged as a Wolf's bottle, and there made to bubble through milk of lime kept at a temperature of about 205° . Here the watery vapor, chlorine, hydrochloric-acid, and some of the chlorinated compounds, are for the most part condensed or combined, while the more volatile substances, among which are the chloroform and alcohol, pass on to the first condenser or cooler. The water around the worm of this cooler is kept nicely regulated at about 165° , so that in it much of the vapor of water yet remaining, and almost all the alcohol vapor, is condensed and abstracted, leaving the vapor of chloroform to pass on to the final condensers in a state tolerably pure. These final condensers are supplied with cold water, and in them the remaining condensable vapors are brought to the liquid condition. The product of crude chloroform at this stage is about thirty-six fluid ounces.

During this part of the process the contents of the still occasionally froth up, and would pass over with the vapors except for the arrangement of a cribriform cup of lead at the top of the still, inside, whereby a fine shower of cold water from a hose faucet is made to fall upon the frothing mixture.

Steam is then admitted to the still again, and the distillation continued, after the impure chloroform has ceased to separate, until the distillate no longer contains any traces of alcohol or chloroform. This weak distillate is used instead of water, to dilute the succeeding charge.

The crude chloroform is then washed three times with an equal volume of cold water, to deprive it of alcohol, acetic acid, &c., and set aside till the product of several charges is accumulated. It is then shaken with an equal volume of a dilute solution of carbonate of soda to free it from traces of chlorine, and at the end of the process, is finished by rectification from a mixture of slaked and quick lime, in a glass apparatus. The washings, except those of carbonate of soda, with the liquid condensed in the cooler, and, every third charge the contents of the lime purifier, are added to the succeeding charge, and in this way

seven charges are worked off from the apparatus each day during the process.

The chlorinated lime or "bleaching powder," for this process, reacts in virtue of, and in proportion to the hypochlorite of lime it contains; and the chlorine of this hypochlorite, which is the ultimate effective reagent, varies in general between twenty-four and thirty per cent. of the whole weight. Occasionally there is as much as three or four per cent. variation in the proportion of chlorine in the contents of the same cask, through long keeping, carelessness or design in the manufacturing, the chlorine being the expensive element.

The alcohol for this process should be highly rectified, because in this rectification, up to ninety-one per cent. for instance, it must necessarily be freed to a great extent from the grain oils and other impurities whose reaction with chlorine produce deleterious compounds.

Manufacturers on the large scale, who too often take purity of product into their scheme as collateral, use in this process whiskey, or spirits that have been recovered from other processes, as extraction of alkaloids, &c., which are cheap, but are of course filled with foreign substances, whose reaction, with chlorine, cannot be prevented nor determined. In this way, notwithstanding the assertions that have been made to the contrary, there can be little doubt that many deleterious compounds are produced in the process, and pass with the chloroform (no lime purifier being used) not only into the market where the profits are realized, but also into the lungs of the patients, and by reflection affect injuriously the credit and character of the medical profession.

These deleterious compounds are exceedingly subtle, and like many hydrocarbon compounds, are often produced in groups. From the looseness of their affinities, they are so delicate and so easily modified in character and composition, that they may be more or less noxious in a proportion that it is impossible to determine, even at different ages, of any given sample. From these circumstances it happens that they are very difficult to separate or determine; but fortunately they are not difficult to detect. If they ever occur in chloroform made properly, and from good materials, it must be very rarely, and in proportions too minute

to be hurtful. A trace of acetic ether is often present in very good chloroform, even to an extent perceptible in the odor, but it is not at all hurtful in such proportion. Chlorinated lime containing twenty-seven per cent. of chlorine or hypochlorite, will yield, with the above process and management, seven per cent. of its weight in pure chloroform. And the alcohol used will yield ninety-two per cent. of the weight of the absolute alcohol it may contain; or alcohol of ninety-one per cent. will yield 83.7 per cent. of its weight of finished chloroform.

The writer avoids in this place, as foreign to the intended practical and medical character of this paper, all discussion of the theory and reactions of the process. It is sufficient to say that chloroform is generally regarded as a terchloride of formyle, and has the ultimate formula C_2HCl_3 . The chemically pure chloroform as represented by this formula should practically be associated with a little alcohol, and perhaps water, in order that it may keep well without troublesome precautions. That produced by the above process contains a little water, but is almost chemically free from alcohol, and as produced is liable to slight decomposition with the production of free chlorine. Hence it is useful and proper to add a small proportion of ordinary alcohol, so that the s. g. may be reduced from 1.498 to the officinal standard, namely, 1.49, or at least to 1.494.

The writer is convinced by observations upon chloroform made by himself, that a tendency to decomposition becomes very strong when chloroform has a purity indicated by a density above 1.497, and that decomposition will be almost inevitable when the density is above 1.498, and he believes that this circumstance explains the fact that chloroform which has been purified with concentrated sulphuric acid alone, rarely keeps well, although known then to be almost chemically pure. The acid abstracts not only the impurities as such, but also the last portions of water and alcohol. Then when a single point of decomposition is determined by light or other incitant to chemical reaction, that reaction proceeds as in a process of fermentation until the whole is decomposed. The small proportion of alcohol may prevent this in many ways, but probably by closing the circuit of the composition of the compound as the circuit of the magnet is closed by its keeper, or as the decomposing forces

of some acids are controlled by combination. Thus, if the balance of affinities is disturbed in the direction of decomposition, the disturbing forces being equally efficient for recombination when material is present in the proper condition—alcohol, the original matrix being present, the chain is again closed and complete.

With regard to the effect of sulphuric acid, it is true that the best manufacturers in Edinburgh, where perhaps chloroform is best made and most used, do purify their product with the acid, but then they distil it from the acid after having combined the latter with baryta. Thus after the acid has performed its office of destroying all the impurities, it is, in effect, prevented from carrying off with it the last portions of alcohol and water, by having presented to it a substance for which it has a superior affinity, and for which it abandons the alcohol and water, and these latter are again seized by and carried over with the chloroform. This process of purification has been long used, and is probably unobjectional in effect. It is, however, not better than that above given, while it is far more troublesome and expensive.

The risk of decomposition from too high density is, however, one of the very least that commercial chloroform has to encounter, for where one specimen is found to be above 1.49, hundreds are found below it. Indeed, it is very rare to meet with a specimen whose density is above 1.49, the greater number by far being about 1.46 to 1.48. Low specific gravity alone, however, does not render the preparation noxious or bad, as is shown by the common use of a tincture of chloroform. Yet, when of a low specific gravity, it is almost invariably bad, from the simple fact that the manufacturer in leaving it thus, must leave other impurities in it which would have been in great measure removed by the washings required to free it from alcohol.

In short, the bad effects which are attributed to chloroform, and which have brought upon this anæsthetic a large share of the distrust in which it is held, are, in the opinion of the writer, due to the presence in it of foreign deleterious compounds, which are the result of faulty preparation and bad materials.

Fortunately these deleterious compounds may be easily detected, and by very simple means within the reach and practice of every one who can have occasion to use chloroform; and every

specimen that is used should be subjected to the scrutiny. Some such simple tests for each important preparation of the *materia medica*, well known and freely applied by the physician, is what is now most needed by the profession. But the profession should not depend upon the knowledge and research of the chemical manufacturer for the discovery and application of such tests, for very obvious reasons.

When equal volumes of chloroform and pure concentrated sulphuric acid are shaken together, and then allowed to separate, there should be no odor, or but a mere faint tinge of color imparted to the acid, and there should be no heat developed in the mixture. Any chloroform that will satisfy these simple conditions, may be considered pure, and may be used with confidence, while all that will not, should be unequivocally rejected. In the use of this simple and easy test, the indication of color has relation to the deleterious impurities, and that of temperature to the specific gravity or dilution, for if any water or alcohol be present their combination with the acid produces rise of temperature. Chemically pure chloroform, when thus shaken with the acid, produces no sensible effect upon either. The chloroform of the process given, causes a faint tinge of color in the acid after prolonged and vigorous shaking, and produces a rise of temperature in the mixture of seven or eight degrees, not perceptible to the hand. The amount of heat developed may be conveniently noted by observing the force with which the stopper is thrust outward on removing it, for the rarefaction of the air contained with the mixture will produce a pressure upon the stopper exactly in proportion as it is warmed by the mixture. Differences in temperature not perceptible to the hand, may be detected in this way if the necessary precaution is observed to avoid the influence of the warmth of the hand in shaking the bottle. A thermometer introduced before and after the shaking is, however, more accurate and reliable, when accuracy is necessary.

This is by no means the only qualitative test for chloroform, but as it is the most simple and easy, and is practically reliable, it is useless to occupy time and attention with others. Few samples of chloroform as ordinarily found now, will meet the requirements of this test, and yet the preparation is generally much better than it was four or five years ago.

The slow decomposition before alluded to as liable to occur in chloroform of high density, is easily detected, first, by the odor of chlorine, which is more strongly marked on first opening the bottle,—and again, by suspending moistened blue litmus paper in the bottle above the liquid. This decomposition commences, and in most cases is limited to the vapor above the liquid. When it has seriously affected the liquid chloroform, there is little danger but that the specimen will be rejected, for the odor of chlorine is then so strong and pungent that it becomes almost impossible to inhale the vapor. Chloroform that is undergoing the slow decomposition from too high density alone, may give no acid or bleaching reaction with litmus paper, when immersed in the liquid, nor more than the faintest possible cloudiness when shaken with solution of nitrate of silver, but if a piece of moistened litmus paper be suspended in the vapor within the bottle, it first becomes of a reddish tinge, about the edges first, and is then more or less bleached, or turned of a dingy white color. Test paper so suspended becomes more or less red within half an hour, in almost all samples of good chloroform that has been long kept, but is never bleached unless decomposition is going on. This distinction of reaction is important, and affords very clear indications. In ordinary commercial chloroform of low density, the vapor above the liquid is rarely acid, even when the liquid itself is so. When very delicate shades of acid reaction are to be detected, the strip of blue litmus paper should be torn rather than cut at its free extremity, and the reaction looked for upon the projecting fibres of the torn edges.

It has been before stated that the addition of a small portion of alcohol prevents the decomposition of good chloroform. The addition of alcohol also arrests this decomposition, even after it has gone on for many weeks, but it does not of course free the remaining chloroform from the products of the decomposition. In this case a new rectification is required to separate the watery looking fluid which is produced, and either adheres to the bottle about the edges of the surface of the chloroform, or is diffused through it, rendering it opalescent. The appearance of this liquid on the addition of alcohol is an unfailing test of the condition of the chloroform in this respect. New rectification from powdered quick-lime separates this fluid, and renovates the chloroform entirely.

The addition of eight drops of alcohol to each fluid ounce of decomposing chloroform, or .53 per cent. of its weight, is the minimum proportion which has been successfully used, though this is not probably the limit in that direction. Such an addition, namely, .53 per cent., reduces the s. g. by .0055, or reduces chloroform of s. g. 1.4989 to s. g. 1.4934. A better proportion of alcohol is, however, 10 drops to each fluid ounce, or .66 per cent., reducing the s. g. by .0069, or from 1.4989 to s. g. 1.492.

The writer has on two occasions, at least, administered without any unusual effect, chloroform that gave an acid reaction not only with suspended litmus paper, but also with that which was immersed in the liquid. But it was first ascertained by solution of nitrate of silver, that the acid was not hydrochloric.

He has also used portions that were undergoing slow decomposition, as indicated by the bleaching effect upon suspended litmus paper, and equally without bad effects.

These circumstances greatly strengthen the position assumed, that it is not chloroform, nor its legitimate elements or constituents, that produce the bad effects, but foreign substances of very different nature and composition.

The specimens before the Academy are :—

First. Chloroform that is undergoing the slow decomposition. S. G. 1.4989. This is the product of the described process, without the addition of alcohol.

Second. A portion of the same chloroform in which the decomposition has been arrested by the addition of .66 per cent. of alcohol. The watery looking fluid and opalescence produced is distinctly visible. S. G. 1.492.

Third. A portion of the second specimen completely renovated by rectification from powdered quick lime. S. G. 1.492.

Fourth. Chloroform made at the same time, and by the same process as the first specimen, but of a little lower density, from being a later portion of the distillate in the rectification. This having undergone no perceptible change. S. G. 1.4984.

Fifth. Chloroform made in 1853, exhibiting the strongly acid reaction of the vapor, while the liquid is neutral, or very nearly so. S. G. 1.492.

Sixth. Chloroform in the condition ordinarily dispensed in the Navy. S. G. 1.492.

Seventh. The best of four samples of chloroform as supplied to the Navy prior to 1853. As these were always obtained from the best druggists, and commonly at high prices, they probably represent the best chloroform of the common market at that time. S. G. 1.474.

The suspended moistened litmus papers exhibit the vapor reactions in each, while the separated portions exhibit the characteristic reaction with sulphuric acid and the thermometer. The writer is under obligations to some members of the Academy, for the opportunity of exhibiting the effect of the tests upon specimens of chloroform from the best sources newly purchased, and not before seen or examined by the writer.

In the early part of the career of chloroform, it was not only very badly made, but was also badly applied, and without discrimination or proper limit, and that bad results followed is scarcely to be wondered at.

These circumstances enter largely in explanation of the fact, that of the sixty-five or six reported cases of death by chloroform, not more than three or four have been noticed as having occurred within three years, and not one very lately, while there is no evidence of abatement in its use within that time.

As there appears to be some tendency in the profession here; to take up and examine anew into the safety of chloroform as an anæsthetic, the following significant facts may be mentioned. There is no doubt that chloroform has always been, and is still very largely used in Great Britain; perhaps as freely and successfully as ether here, so that the number of cases in Edinburgh alone is now stated at over 200,000. The bona fide confidence in it, after so large an experience, is just now evinced by the circumstance of its having been administered to the Queen in her ninth parturition. If chloroform can be used there with the confidence and safety thus indicated, is it not probable that similar chloroform could be used with equal safety here?

Probably the strongest reasons why ether has been more safe than chloroform here, are,—first, that ether cannot be made from low grades of alcohol at all,—secondly, that the concentrated sulphuric acid destroys most of the impurities of the alcohol in the process of etherification,—and finally, that the manipulation of the ether process is easier, and the impurities less noxious.

Therefore bad ether may be justly considered more safe than bad chloroform, but that good ether is more safe than good chloroform, the writer does not believe.

As a corollary, therefore, it would appear that the practice of the profession has really been in the hands of the manufacturer, and it is the more to be regretted that in this respect chloroform stands by no means alone.

During the past five years the writer has made 187 pounds of chloroform for the Navy, most of which has been dispensed and used, and as yet without a single reported case of bad results. Within that time he has personally administered it for anæsthetic purposes twenty-two times, without any apparent hazard, and with the occurrence of no disagreeable consequences greater than nausea afterward, and this in one instance only. In the case of one old man, with shattered constitution and one hepatized lung, it appeared necessary to use it very cautiously; but its use was continued through 45 minutes with excellent effect.

This very limited experience in its application, inclines the writer to agree with those who regard the respiration rather than the circulation as the function to be most closely watched, as the index to its ordinary administration.

It has not been the object of this paper to cover the whole ground upon this subject, or to occupy the time of the Academy by a recapitulation of what is already well known from other sources. Its somewhat desultory character may, therefore, possibly be excused.—*American Medical Monthly, July, 1857.*

ON TESTING THE AMOUNT OF ACETIC ACID IN VINEGAR.

By J. OTTO.

Nicholson and Price have brought the process of determining the amount of acid in vinegar by neutralization by alkalies or alkaline carbonates, into disrepute. They state, that very inaccurate results are obtained, because the alkaline acetate has an alkaline reaction; and that the testing must be effected with carbonate of lime or baryta, or by means of the carbonic acid apparatus of Fresenius and Will. They found these statements upon experiments, the results of which are summoned up in what follows. The numbers indicate the per-centage of hydrated

acetic acid, which was found by the various methods of testing in concentrated or dilute acetic acid.

Carbonate of Soda.	Carbonate of lime.	Carbonate of baryta.	Fresenius & Will's Method.
87.9	99.6	99.4	99.3
45.3	52.8	52.3	52.0
22.1	25.5	25.7	25.3

How different are the numbers of the first series from the corresponding numbers in the others, in which the greatest accordance is exhibited!

The experiments of Nicholson and Price were exceedingly unwelcome to me, as I was just engaged in the preparation of a new edition of my Text-book of Vinegar Manufacture. I should have to condemn the former method in general use, for the determination of the amount of acid in vinegar, as well as my acetometer, in which a dilute ammonia is used as the acetometric fluid. Not so much to check the correctness of the experiments in question, which appeared to me to be beyond a doubt, as to see whether, in the case of an acetic acid so diluted as the vinegars, the error was not so small that it might be passed unnoticed, or whether it was not constant in amount, I made a few experiments. I will communicate these in the following. The numbers represent centesimal parts of anhydrous acetic acid in the vinegar examined.

Acetometer.	Carbonate of soda.	Carbonate of baryta.
6.3	6.5	6.2*
9.1	9.2	9.0

The acetometric ammoniacal fluid was prepared with the greatest exactitude.

For testing with carbonate of soda, a normal solution of the anhydrous salt containing 104 grms. in the litre was employed, and a Mohr's burette was used. 5 cub. cent. of the solution indicate 1 per cent. of acetic acid in 50 grms. of vinegar. The point of neutralization was ascertained in the heated vinegar by means of pale blue litmus paper.

In testing with carbonate of baryta, a weighed quantity of the salt was put into a weighed quantity (10 or 50 grms.) of vinegar, and digested therewith, at last at a high temperature, until the solution produced had an alkaline reaction. For this purpose a long time was required. The undissolved carbonate of baryta

* In two perfectly concordant experiments.

was collected on a filter, carefully washed, dried, calcined and weighed. 98.5 of carbonate of baryta, represented 51 of acetic acid (1 equiv.)

It might be objected against these experiments, that possibly I did not continue the digestion of the vinegar with the carbonate of baryta long enough, for there is no other means of judging of the completion of the digestion, except the reaction. For this reason I made the following experiments, which must remove all doubt, and which may easily be repeated in a few minutes.

27 grms. of crystallized acetate of soda were dissolved to form 100 grms. of solution. This solution contained 10 grms., or 10 per cent. of acetic acid. It had an alkaline reaction with red-dened litmus paper. It was rendered perfectly neutral by 2 cub. cent. of vinegar, containing 4.5 per cent. of acid, and the addition of 1 cub. cent. more vinegar caused it to react distinctly acid upon blue litmus paper; 2. cub. cent. of vinegar of 4.5 per cent. do not contain fully 0.1 grm. of acetic acid; the error, therefore, which results from the alkaline reaction of acetate of soda in the determination of the acidity of a vinegar of 10 per cent., can at the utmost only amount to $\frac{1}{10}$ th per cent., and is certainly always less, as a little too much soda is usually added.

A hot solution, containing 50 per cent. of acetate of soda, representing 18.7 per cent. of acetic acid, was rendered neutral by 2 cub. cent. of vinegar of 9 per cent., and distinctly acid by another cub. cent.

The process hitherto in use for the determination of the amount of acid in vinegar by means of alkalies or alkaline carbonates may therefore be retained, as it gives sufficiently accurate results; the alkaline reaction of the alkaline acetates does not affect the accuracy in a noticeable degree.

When, many years ago, I constructed the acetometer to which my name has been given, and by means of which the amount of acid in a vinegar is ascertained very conveniently and rapidly, and also very exactly if the acetometric fluid has been correctly prepared, I was obliged to make experiments as to the amount of ammonia in liquid ammonia of various specific gravities, and sketch out a table of them. Very recently, Carius has ascertained the amount of ammonia in solutions of ammonia in a very

different way (Liebig's *Annalen*, xcix. p. 129.) As appears from the following comparison, my table agrees so closely with that calculated by Carius, that it deserves perfect confidence for use in the preparation of the acetometric fluid.

Amount of ammonia in the fluid.	Specific gravity.	
	Carius.	Otto.
12 per cent.	0.9520	0.9517
11 "	0.9556	0.9555
10 "	0.9593	0.9593
9 "	0.9631	0.9631
8 "	0.9670	0.9669
7 "	0.9709	0.9707
6 "	0.9749	0.9745
5 "	0.9790	0.9783

Chem. Gaz., July 1, 1857, from *Liebig's Annalen*, April 1857.

EXAMINATION OF JAPANESE PEPPER, THE FRUIT OF THE XANTHOXYLUM PIPERITUM OF DE CANDOLLE.

By JOHN STENHOUSE, L.L.D., F.R.S.

About three years ago, I published a cursory examination of Japanese pepper, and described a crystalline principle, to which I gave the name of Xanthoxylin, made with a specimen received from my friend Daniel Hanbury, jun., Esq. Having recently obtained a larger quantity of the same material, I was enabled to submit it to a more extended examination.

"Japanese pepper is the product of *Xanthoxylum piperitum*, De Cand., (*Fagara piperita*, Linn.), a tree of Japan of the natural order Rutacæ, figured and described by Kœmpfer, in 1712.

"It consists of roundish sessile capsules of the size of a peppercorn, which appear to have been nominally four in number, situated at the extremity of a peduncle, though but one or two are usually fully developed. The capsules, which are externally reddish brown, have their outer covering beset with numerous prominent tubercles, enclosing an acrid liquid, to which the pepper owes its pungent flavor. The seeds are black, shining, and devoid of pungency; from dehiscence of the capsules

they are generally wanting in the sample which we have examined.

"The flavor of Japanese pepper is aromatic and agreeable, with a pungency not unlike that of pellitory (*Radix pyrethri*). Its odor when bruised is remarkably fragrant.

"It is employed as a condiment by the Japanese and Chinese."

The seeds after being crushed in a mortar were distilled with water. The distillate consisted of water, containing a mixture of an oil and a crystalline solid body (Xanthoxilin) floating on its surface.

The oil and stearopten, having been removed from the water, was strongly cooled when the greater portion of the stearopten crystallized out, and was separated from the oil by filtration.

The Oil.—When the oil was submitted to fractional crystallization, the greater portion came over about 130° C., and was found to be free from stearopten. The portion remaining in the retort was transferred to a beaker, loosely covered by a piece of filter paper, and allowed to stand for several weeks, when a quantity of stearopten deposited. The crude oil boiling at 130° C., was well shaken and allowed to stand in contact with fused chloride of calcium to remove adhering moisture, then distilled off caustic potash, and afterwards rendered quite pure by being rectified off sodium and a small quantity of potassium.

The oil after having been purified in the manner above detailed had a constant boiling point of 162° C.

When burnt with oxide of copper in the gas furnace:

I. 0.192 grms. of oil gave 0.198 grms. of water, and 0.62 grms. of carbonic acid.

II. 0.191 grms. of oil gave 0.199 grms. of water, and 0.623 grms. of carbonic acid.

THEORY.	EXPERIMENT.	
	I.	II.
C ₁₀ = 60 — 88.23	88.00	88.02
H ₈ = 8 — 11.77	11.45	11.62
68 100.00		

From the above numerical results, it is evident that the oil is a hydrocarbon, isomeric with oil of turpentine. The pure hydrocarbon, to which I propose to give the name of Xanthoxylene, is colorless, refracts light strongly, retains its original extremely pleasant aromatic odor even after repeated rectifications, and does not undergo the alteration of odor which is usually exhibited by hydrocarbons obtained by the distillation of essential oils after treatment with sodium.* On saturating the oil with dry hydrochloric acid gas, and allowing it to stand for many days, no crystalline body was obtained, but a liquid combination with hydrochloric acid was evidently produced.

The Stearopten.—The crystalline body, or stearopten, which deposited on the surface of the water obtained by distilling the seeds with that liquid, which was also produced by the spontaneous evaporation of the crude oil boiling above 130° C., was purified by repeated crystallizations out of alcohol. The stearopten thus purified presented the form of large crystals of a fine silky lustre, and when analysed gave the following results:—

I. 0.2135 grms. gave 0.118 grms. of water, and 0.477 grms. of carbonic acid.

II. 0.252 grms. gave 0.139 grms. of water, and 0.563 grms. of carbonic acid.

III. 0.332 grms. gave 0.184 grms. of water, and 0.748 grms. of carbonic acid.

THEORY.	EXPERIMENT.				
	I.	II.	III.	IV.	N.
$C_{40} = 60 - 61.22$	50.88	60.91	61.11	61.09	61.09
$H_6 = 6 - 6.12$	6.31	6.11	6.00	6.45	6.80
$O_4 = 32 - 32.66$	—	—	—	—	—
98 — 100.00	—	—	—	—	—

The stearopten is insoluble in water, but readily soluble in alcohol and in ether. When quite pure it possesses a very slight

*The pleasant aromatic odor of Japanese pepper is due to Xanthoxylene.

odor resembling that of stearine, and its taste is slightly aromatic. It distils unchanged, the melting point before and after distillation being the same, namely, 80° C., and its solidifying point 78° C. An alcoholic solution of the stearopten added to alcoholic solutions of nitrate of silver and acetate of lead, even on the addition of ammonia, gave no precipitate—nitric acid converts the stearopten into oxalic acid.

In my former notice of Xanthoxylin, which, from the very small quantity at my command, I had endeavored to purify from adhering resin by washing it with ammonia, I found a minute trace of nitrogen, no doubt arising from the small quantity of ammonia adhering to the crystals.

When Xanthoxylin is perfectly pure, however, it is entirely devoid of nitrogen.—*Pharm. Journ.*, July 1, 1857.

ON A NEW SULPHIDE OF CARBON (CS).

By M. E. BAUDRIMONT.

As yet only one sulphide of carbon is known to exist, namely, CS_2 , corresponding to carbonic acid CO_2 . A protosulphide CS corresponding to carbonic oxide CO has never been obtained. It is the discovery of this compound which I have the honor of announcing to the Academy, and which has occupied me for several months. I propose at present to briefly indicate the preparation and analysis of this new body, with some of its properties, and to reserve for a future occasion the complete account of its investigation.

Protosulphide of carbon may be obtained by the following processes:—

1st. By decomposing the vapor of ordinary bisulphide of carbon with spongy platinum, or with pumicestone heated to redness; under these circumstances the bisulphide is decomposed, an abundant deposit of sulphur takes place, which often chokes up the tube, and a gaseous body is formed, which is the protosulphide of carbon CS. This well-defined reaction is sufficiently explicit.

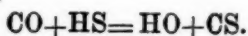
2nd. It is obtained simultaneously with the bisulphide when that body is prepared by the ordinary method.

3rd. By decomposing the vapor of CS_2 at a red heat with pure lampblack or wood charcoal, but especially with fragments of animal charcoal.

4th. By decomposing the vapor of the bisulphide with hydrogen at a red heat.

5th. By calcining sulphide of antimony with an excess of charcoal.

6th. By the reaction of carbonic oxide upon sulphuretted hydrogen at a red heat.



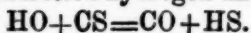
7th. By the reaction of sulphurous acid upon carburetted hydrogen at a red heat.

8th. By the reaction of carbide of hydrogen with chloride of sulphur at a red heat.

9th. It is produced during the decomposition of sulphocyanogen by heat, &c.

The first process yields the gas in a state of purity; but when obtained by other methods, it is contaminated with sulphide of hydrogen or carbonic oxide. It may, however, be purified from these by being rapidly passed through a solution of acetate of lead, chloride of copper dissolved in hydrochloric acid, and then drying the gas collected over mercury.

This body is gaseous, colorless and possesses an odor reminding one of ordinary sulphide of carbon, but not disagreeable, and strongly ethereal. Respired in any large quantity, it appears to be powerfully anæsthetic. It burns with a bright blue flame, producing carbonic acid and sulphurous acid. It resists the cold produced by a mixture of ice and salt. Water dissolves about its own volume of it, but the solution rapidly decomposes into sulphuretted hydrogen and carbonic oxide.



It is not more soluble in alcohol or ether.

The solution of chloride of copper does not absorb it. Solution of acetate of lead is not effected immediately, but, after some hours' contact, the liquor blackens, and the salt is completely transformed into carbonic oxide and sulphide of lead. In contact with solutions of the alkalies, potash, soda, &c., it is rapidly decomposed. With lime water, for example, the reaction gives sulphide of calcium and a volume of carbonic oxide, equal

to that of the gas employed. This remarkable reaction accurately establishes its composition $\text{CaO} + \text{CS} = \text{CaS} + \text{CO}$, no carbonate of lime being produced.

At a red heat it is feebly decomposed—1st, by a spongy platinum; 2ndly, by the vapor of water into HS and CO; 3rdly, very readily by hydrogen into HS and CH; 4thly, by copper into graphitoid carbon and sulphide of copper; and, finally, by exposure to the sun with an equal volume of chlorine, a reaction takes place, a partial condensation and formation of compounds, which I am at present investigating. Analysed by oxygen in the eudiometer, it gives equal volumes of carbonic acid and sulphurous acid, from which we may deduce the formula CS as representing its composition. The composition is also established by the action of lime water, which, as I have stated, resolves it completely into carbonic oxide and sulphide of calcium without the production of any carbonate of lime. We also arrive at the same conclusion from determining the quantities of carbon and sulphide of copper, produced by its decomposition with that metal.

Many chemists have attempted to discover this body; and its having escaped their investigations, is attributable, without doubt, to its reaction upon water and the solutions of the alkalis, which resolve it into carbonic oxide and sulphuretted hydrogen.—*London Pharm. Journal*, July 1st, 1857, from *Comptes Rendus*.

NEW METHOD OF DETECTING IODINE AND BROMINE.

By MM. O. HENRY, Jr., and E. HUMBERT.

The authors employed this process with the view of determining the presence of iodine in the waters of Vichy, in which its existence was a matter of dispute. It presents great analogy with that recommended by them for detecting traces of hydrocyanic acid in cases of poisoning, and is applicable in all possible circumstances. In the case of a mineral water it is as follows:—

The water (or the more or less concentrated residue of its evaporation) is treated with acid nitrate of silver. The pre-

450 CONVERSION OF MANNITE AND GLYCERINE INTO SUGAR.

precipitate formed must contain the chlorine, bromine, and iodine of the water. It is washed and carefully dried. It is then intimately mixed with a little cyanide of silver and introduced into a tube, at one end of which it is fixed between two plugs of wadding and abestos. A current of very dry chlorine is then passed slowly over the mixture, whilst the corresponding part of the tube is slightly heated. The iodine, bromine, and cyanogen are displaced, combine and condense in the colder parts in the form of a white crystalline ring of iodide and bromide of cyanogen. The tube is then closed at both ends, and may serve in case of need as a piece of evidence.

The physical and chemical properties of iodide and bromide of cyanogen do not allow them to be confounded with other compounds. The iodide sublimes at 113° , and the bromide at 59° F. This allows them to be separated mechanically by plunging the tube into water at 86° F. The iodide and bromide give the principal characteristic reactions of iodine and bromine.

Pure substances must be employed to furnish the chlorine required, and the apparatus should be set in action for some time before the commencement of the experiment. For this purpose cyanide of silver alone is put into the tube; if no trace of iodide or bromide of cyanogen sublimes, the operation may be proceeded with.—*London Chem. Gaz.*, June, 1857, from *Comptes Rendus*.

ON THE CONVERSION OF MANNITE AND GLYCERINE INTO TRUE SUGAR.

By M. BERTHELOT.

The analogies existing between the alcoholic fermentation of mannite and glycerine and that of the true sugars, at once give rise to the opinion that these two fermentations might not really be distinct; if mannite and glycerine furnish alcohol, they probably pass previously through the state of sugar.

To determine this question, the author has made various experiments, the results of which differed according to circumstances. Under the normal conditions of the alcoholic fermentation of mannite and glycerine, with the simultaneous influence

of carbonate of lime and caseine, their conversion into alcohol, either at 104° F. or at 50° F., takes place directly, without the least indication at any moment of the temporary existence of a true sugar. But the regular course of these experiments requires the presence of carbonate of lime; if this be suppressed, the mannite and glycerine usually remain unaltered, but sometimes, and only under peculiar circumstances, the formation of a true sugar may be observed.

Mannite and glycerine dissolved in water were left at the ordinary temperature in contact with all the nitrogenous tissues and substances of an animal or analogous nature which the author could procure. In many cases a true sugar was produced, capable of reducing potassio-tartrate of copper, and of undergoing alcoholic fermentation under the influence of yeast.

The conditions of this formation of sugar are sometimes capable of definition, sometimes exceptionable. It was observed with albumen, caseine,* fibrine, gelatine, and cutaneous, renal, pancreatic tissues, &c., but always accidentally, and so that the conditions of the phenomenon could not be determined.

The tissue of the testicle alone caused the conversion of glycerine and mannite into true sugar almost in a regular manner. The testicles of man or animals (the cock, dog, or horse) are cut into small pieces and placed in a solution consisting of 10 parts of water and 1 part of mannite and glycerine; the weight of the animal tissue (supposed to be dry) should represent about $\frac{1}{20}$ th of the mannite or glycerine. The operation is effected in an open bottle, under the influence of diffused light, at a temperature between 50° and 68° F. The tissue usually remains with-

* The following are some of the causes of error which must be well guarded against in these experiments:—1. Albumen and caseine contain small quantities of sugar, of which they must be freed. 2. The mannite of commerce must always be purified, as it contains 1 to 2 per cent. of sugar. This sugar is derived from manna, which contains 10 to 15 per cent. The amount of sugar pre-existing in manna does not increase by keeping. Besides sugar and mannite, manna contains nearly half its weight of little known substances, so that the employment of manna in these experiments cannot lead to any conclusion. 3. The so-called *purified* commercial glycerine contains a body capable of reducing tartrate of copper.

out putrefying; if it putrefies the experiment is a failure. The formation of moulds, and especially of *Penicillium glaucum*, is also injurious. After an interval of from a single week to three months, it is usually found that a substance has made its appearance capable of reducing potassio-tartrate of copper, and fermenting immediately with yeast. At this moment the fragments of testicle are separated by decantation, and completely freed from the mannite of glycerine by repeated washing; in this state they possess the property of converting these two substances into true sugar. The prepared tissues are operated with in the way just described, and it is even sufficient to impregnate the tissue with a solution of mannite or glycerine, to obtain a very abundant formation of sugar in a few weeks. Some experiments made with dulcine gave similar results.

The sugar thus formed is analogous to glucose in most of its properties. It could not be obtained crystallized, and is very soluble in water, aqueous alcohol and glycerine, from which it can hardly be separated. It is a very hygrometric body, very alterable during the evaporation of its solutions, capable of becoming brown under the influence of alkalis, and of reducing potassio-tartrate of copper; ammoniacal acetate of lead does not precipitate it in sensible proportions. With yeast it ferments immediately, producing alcohol and carbonic acid. It was difficult to ascertain whether it possess a rotatory power, from the readiness with which it becomes colored during the concentration of its solutions. Once the author succeeded in observing a deviation of the tint of passage equal to $5^{\circ}.5$ for a length of 200 millims. : with a liquid containing about one-twentieth of sugar; it would therefore have a left-handed rotation, and be distinct from glucose and most of the other sugars in the direction of its rotatory power.

One of the most decisive of the author's experiments to determine the origin of this substance and the influence of the testicular tissue upon its formation, is as follows:—

On the 18th of December, 1856, he weighed 2 grammes of fresh cock's testicle (representing 0.280 grm. in the dry state), 5 grms. of mannite, and 50 grms. of water; the whole was put into a bottle communicating with the atmosphere through a tube filled with carded cotton, and left in a moderately heated labor-

atory. On the 12th of April, 1857, the liquid contained 0.250 grm. of true sugar. The fragments of testicle retained their form and microscopic appearance; some almost inappreciable traces of vegetation were discovered on careful examination. When washed and dried, these fragments weighed 0.230 grm., so that they had lost 0.050 grm. This loss, however, is rather apparent than real, for the fresh testicles contain a certain portion of saline and other substances which are soluble in water, and a portion of the tissue becomes disaggregated and soluble without changing into sugar; all these products are calculated as loss, although they are found in a soluble state, and partially coagulable during the evaporation of the liquid. Taking into account these various circumstances, and the proportion of sugar formed in the preceding and other experiments, without speaking of the analogies of composition and constitution existing between the sugars and the mannite and glycerine, we shall be led to regard the sugar thus produced as resulting principally, perhaps exclusively, from the transformation of the mannite or glycerine. This conclusion is also confirmed by other experiments, in which, without perceptible diminution, the testicular tissue produced the conversion of mannite into sugar, seven times consecutively.

These facts tend to assimilate the influence of the testicular tissue with the actions of contact which have been observed in inorganic chemistry, and this is confirmed by the permanence of the microscopic structure of the tissue in the course of the experiments. These, however, are probabilities rather than a demonstration. In fact, the animal tissues do not enjoy that absolute invariability of composition which often characterizes the mineral compounds acting by contact. At the same time that the tissue acts, it becomes continuously altered; it is decomposed without putrefaction, as shown by analysis.

Thus it cannot be decided positively whether the tissue operates by the action of contact in virtue of its organic structure, or its chemical composition, or whether the very fact of its decomposition does not exert some influence. Lastly, the contact of the air, without which these experiments would not succeed, introduces a new complication, for it allows the development of microscopic animal vegetable organisms; this could never be altogether

avoided, but it appears rather injurious than otherwise. In the most successful experiments, the formation of organized beings took place in the lowest possible degree.

These details show how complex are the phenomena of fermentation, and how many unknown and obscure elements they include; nevertheless, chemists may set in action the forces which cause them, and direct them upon definite bodies, and to the accomplishment of determinate metamorphoses. It is nearly in the same way that they set in action the ordinary affinities, the intimate nature of which is scarcely better known. The employment of ferments is only distinguished therefrom by the pre-existence of a peculiar and extremely mobile form and constitution, produced without one intervention, under the influence of life.

However this may be, the preceding experiments are distinguished by their synthetic character from the fermentations hitherto known. Instead of changing sugar, mannite, or glycerine into alcohol, lactic and butyric acids, more simple compounds, and more difficult of decomposition, they lead to the conversion of mannite and glycerine, bodies which are tolerably stable, deprived of rotatory power, and approaching those which we know how to produce, into a substance endowed with less stability and a higher order of complication, in fact, into a true sugar, analogous to those formed under the vital influence in the interior of the vegetable and animal tissues.—*London Chem. Gaz. from Comptes Rendus*, May, 1857.

ON THE EMPLOYMENT OF FERROCYANIDE OF POTASSIUM
FOR THE REMOVAL OF RUST SPOTS UPON WHITE LINEN.

By PROF. RUNGE.

The employment of ferrocyanide of potassium may often help us out of great difficulties in the case of rust spots upon linen. These do not always consist of common hydrated oxide of iron, but also frequently of oleate of iron, which can only be removed with difficulty, and with the assistance of heat, by oxalic acid, or the binoxalate of potash; and often not at all by sulphuric or muriatic acid, for these acids can only be applied cold and

very dilute, as otherwise the linen suffers. From the high price of oxalic acid, therefore, a cheap means is wanting, when a great quantity of such iron moulds is to be destroyed. A case of this kind once occurred to the author, in which sulphate of iron had been used instead of potash, by which 300 napkins and other table-linen all acquired a rusty yellow color, which, on being washed with soap, instead of disappearing, became darker; the sulphate of iron being decomposed by the soap, and oleate of iron precipitated upon the fibres.

Immersion even for several days in water acidulated with sulphuric and muriatic acids produced no effect, because the oleate of iron was not decomposed. It was here that the ferrocyanide of potassium did such excellent service. It was added in comparatively small quantity to the water, acidulated with sulphuric acid, and the linen was then moved about in the fluid. The linen became blue. When all the yellow had disappeared, and a clear blue had made its appearance, the linen was rinsed and treated with solution of carbonate of potash. Here the blue color again disappeared, and with it a great part of the yellow, which only remained in spots. These were then very easily got rid of by dilute sulphuric acid alone.

The explanation of this process is easy. By the formation of prussian blue, the oleic acid is separated from the oxide of iron. The carbonate of potash then brought into action combines with the oleic acid, decomposes the prussian blue, and at the same time also dissolves the greater part of the oxide of iron, so that almost all the iron-mould disappears from the stuff simultaneously with the prussian blue. Caustic lye does not act in the same way: it certainly destroys the blue, but the rusty yellow remains, because it has not the same solvent action upon oxide of iron as carbonate of potash.—*Lon. Chem. Gaz.*, July 1, 1857, from *Polyt. Centralbl.*

ACTION OF BICHLORIDE OF TIN ON STARCH.

By M. H. DE PAYR.

On wetting a microscopic slice of a horse-chestnut with a little bichloride of tin, the fecula is observed to disappear. This

observation, which was made by Rochleder, has led to the following researches being made by M. Payr.

On mixing starch with bichloride of tin in a mortar, the starch is almost immediately dissolved; a slight pitchy residue forms in the solution, which may be separated by decantation.

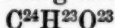
After having filtered the liquid portion, and having added anhydrous alcohol, an abundant precipitate is produced, of a brilliant white, which, washed with anhydrous alcohol, and dried *in vacuo* over sulphuric acid, is found to be composed in 100 parts of:

C	.	.	.	23.44	23.20
H	.	.	.	4.11	4.16
O	.	.	.	33.81	33.97
Sn.	.	.	.	38.67	38.50

On decomposing this matter by a current of sulphuretted-hydrogen a limpid liquid is produced, which is converted *in vacuo* into a white friable mass, which the author found to be formed of:—

C	.	.	40.90
H	.	.	5.67
O	.	.	52.43

Whence he deduces the following formula



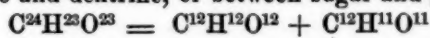
By treating starch with bichloride of tin at 100°C. (212°F.) a starch paste is obtained which afterwards liquifies; alcohol separates from it a white compound containing:—

C	.	.	.	15.56	15.44
H	.	.	.	3.05	3.30
O	.	.	.	24.31	24.18
SnO	.	.	.	57.08	57.08

The precipitate which absolute alcohol produces in this solution made with the aid of heat amounts to scarcely one-fifth part of that formed with the solution made without heat.

The compound $\text{C}^{24}\text{H}^{23}\text{O}^{23}$, obtained with the salt made without heat is not starch, for it is soluble in water, and is not turned blue by iodine. Neither is it dextrine or glucose; but, under the influence of the weak acids, it is readily converted into the latter.

From its properties and its composition, it takes its place between glucose and dextrine, or between sugar and gum, for



Glucose.

Dextrine.

and, like glucose, it is composed of fecula and water.—*Chemist, June, 1857, from Journal fur Praktische Chemie.*

ON SOME CEMENTS.

BY EDMUND DAVY, F. R. S., M. R. I. A., F. C. S. L., &c.

My attention has been directed to make some simple cements, which may admit of useful and ready application.

Gutta percha, as is well known, is itself an admirable cement for certain purposes, when softened by hot water or by a moderate degree of heat; and it has been used in making other cements; but I am not aware of any cement described in which it forms a part: its high commercial value is an obstacle to its application in many cases where it could be employed with advantage.

Gutta percha, though readily adapted to an almost endless variety of uses, is, however, not easily rendered fluid when alone, and hence is not quite manageable enough for certain purposes.

I have made many experiments, using different proportions of gutta percha with pitch, rosin, wax, &c., with a view to form useful cements. In the present communication I purpose to notice only one cement, which I made by melting in an iron saucepan.

Two parts by weight of common pitch, and adding to it one part by weight of gutta percha, stirring and mixing them well together until they were completely incorporated with or united with each other, formed a homogeneous fluid, which may be used in this state for many purposes, but which, on account of the facility and tenacity with which it adheres to metals, stones, glass, &c., I found convenient to pour into a large basin of cold water, in a thinner or thicker stream, or as a cake. In this state, while warm, it is quite soft, but may be soon taken up out of the water and drawn out into longer, or pressed into shorter, pieces, or cut or twisted into fragments, which may again be readily re-united by pressure.

When the cement is cold, or before, it may be removed from the water and wiped dry, when it is fit for use.

From a rough experiment I made, there appeared to be a loss of about $\frac{1}{4}$ th of the weight of the materials in making this cement, arising from volatile matter and impurities in the pitch and gutta percha.

Properties.—This cement is of a black color; when cold, it is hard. It is not brittle, but has some degree of elasticity, which is increased by a slight increase of heat. It appears to be not so tough as gutta percha, but more elastic. Its tenacity is very considerable, but inferior, if I mistake not, to gutta percha. It softens when put into water at about 100° Fahr.; and if the heat is gradually increased, it passes through intermediate states of softness, becomes viscous like bird-lime, and may be extended into threads of indefinite length: it remains in this state, even when exposed for some time in a crucible, to the heat of boiling water, at 212° Fahr. When heated to about 100° Fahr., it becomes a thin fluid. Water appears to have no other action upon it but that of softening it when warm or hot, and slowly hardening it when cold. The cement adheres strongly, if pressed on metal or other surfaces, though water be present, provided such surfaces be warm.

My first trials with this cement put it to a very severe test. I used it as a substitute for plumber's solder in repairing the lead gutters on the roof of my house, which were cracked in several places, and admitted water freely in different places, and also to staunch the leaks in an old common and forcing-pump attached for yielding a supply of water for the use of two houses, and raising it about thirty feet. For these purposes I found it quite effectual. All that was necessary in the case of the gutters was to remove with a brush all loose earthy matters from the cracked lead, slightly warm it with a hot iron, then pour the cement in a fluid state on the cracks, so as to cover them on both sides; then a hot iron was drawn along each edge of the cement so as to soften and bevil it down to the lead, as the cement has intermediate degrees of fluidity, and is thicker or thinner as it is exposed to more or less heat. In its thicker state it may, perhaps, be better adapted to repair cracks in lead or other gutters; but a crack in such gutters may be readily filled up by taking a piece

of the dry cold cement and applying a warm, but not too* hot soldering iron, so as to soften the cement on the crack, then melt it on each side and cover it with the cement. The cement will adhere with great ease to the lead, and is far more manageable than any of our common solders. A hole in a gutter could be readily stopped with the cement and a piece of lead of sufficient size to overlap the hole, say about one-half of an inch; cover the lead on both sides with a surface of the cement; press it on the hole; then cover the lead and its edges with the cement, as in putting a pane of glass.

In the case of the common and forcing-pump, it was only necessary to have every part that leaked quite dry, and slightly warm, when a good coating of the cement, in its thick state, was applied so as completely to cover the cracks or apertures. The cement used in this instance did not exceed in bulk the plumbers' solder which would have been used. The warm soldering iron was lastly applied to fill up any interstices, and produce throughout a uniform surface.

I entertain no apprehension that the warmth of our climate at any time will impair the efficacy of this cement when applied to repair lead, zinc, or iron gutters; for, though it softens at a comparatively low temperature, it still adheres most tenaciously to metals and other substances, and does not allow water to pass through it. My gutters were repaired with the cement before the very hot weather we had last summer, and not the least appearance of a leak has been since observed in the gutters.

In a similar way the cement may be readily applied to repair holes in tin cans, garden watering-pots, iron or other metal vessels which are used only for cold water. Vessels thus repaired should be left a few hours before they are used, as the cement takes some little time to set or harden.

That the presence of water does not interfere with the action of the cement was shown in cases where I put a large hammer, also a seven-pound weight, into hot water, for a few minutes. I then removed them from the water, and, without wiping them,

* When the soldering iron is too hot, and applied to the cement, it decomposes a portion of it, or raises it in a white vapor. When it is of the proper temperature, which is about 130° Fahr., it is merely softened or partially melted.

pressed the end of a small stick of the cold cement on the surface of each, when it softened and strongly adhered to the metals. I then poured a stream of cold water on each of the articles, when they could be raised from the table and carried about, being firmly supported by the cement, and considerable force was necessary to separate the articles from the cement.

This cement is applicable to many useful purposes. It adheres with great tenacity to metals, wood, stones, glass, porcelain, ivory, leather, parchment, paper, hair, feathers, silk, woolen, cotton, linen fabrics, &c. It is well adapted for glazing windows, as a cement for aquariums. As far as my experience has yet extended, this cement does not appear to affect water, and will apparently be found applicable for coating metal tanks; to secure the joints of stone tanks; to make a glue for joining wood, which will not be affected by damp; to prevent the depredations of insects on wood. The heavy oak beams and rafters in the roof of the Royal Dublin Society are attacked to a considerable extent by insects, as the weevil, &c. As this cement is soluble to a considerable extent in volatile oils, as turpentine, naphtha, &c., an application of the solution of the cement in turpentine, &c., might be beneficial, and arrest the ravages of those insects. It may be highly deserving of inquiry whether the cement may not be applied to preserve surfaces of metal and wood exposed to the atmosphere and to fresh water; also to protect anchors, chain-cables, &c., from the corroding agencies of sea water.—*Lond. Chem. July, 1857, from Journal of the Royal Dublin Society.*

ETHEREAL TINCTURE OF SESQUICHLORIDE OF IRON.

(*Tinctura Nervina Bestucheffi.*)

By A. CUSHMAN.

The excess of acid always present in the officinal tinct. ferri chlor. and its exceedingly styptic taste renders its employment in some cases objectionable.

Notwithstanding the large addition made in late years to the number of ferruginous preparations in common use, many practitioners still give preference to the sesquichloride over all others, as being the most certain in its effects, and most accep-

table to the stomach. It is, therefore, desirable that we should be able to present it in a form as free as possible from all objections.

In the German practice the *dry* sesquichloride is frequently prescribed in the form of pills, with ext. gentian and many other excellent combinations; but as this preparation is not recognised as officinal in the U. S. P., it is seldom, if ever, made by our chemists, or kept in the shops.

In a note, under the article on Tinct. Ferri Chlor., by Wood & Bache, allusion is made to the preparation to which I now wish to call the attention of the profession, under the name of *Bestucheff's Tincture*, as an article "much used in Europe," though without giving very definite instructions as to the mode of making it. It consists in a solution of the green crystals of sesquichloride of iron in a mixture of one-third sulphuric ether and two-thirds alcohol.

The tincture thus made is at first transparent, and of a light greenish color, but rapidly becomes turbid and deposits a brownish precipitate.

This precipitate is, however, entirely redissolved, and the tincture rendered perfectly white and transparent, by exposure for some hours to the direct rays of the sun, in small white glass vessels.

The proportion of ether mentioned by Wood & Bache, is one to three or four of alcohol, but that which I have adopted is taken from the Belgian Pharmacopœia, and is the same as prepared for several physicians in Philadelphia, who have used it largely. It is certain that this tincture is a much more elegant one than that of the U. S. Pharmacopœia, while it has the advantage of being perfectly free from acid, and possessing a sweetish, slightly ferruginous taste, instead of the excessive astringency of the latter.

The formula for its preparation is as follows:

Pure iron filings, . . .	two ounces.
Muriatic acid, . . .	eight fluid ounces.
Nitric acid, . . .	four fluid drachms.
Distilled water, . . .	four ounces.

The muriatic acid and water being mixed together; the iron filings are dissolved therein; the nitric acid then being added,

the whole is evaporated till a pellicle is formed, when it is set aside to crystallize. The crystals, as at first procured, are very much discolored, and require to be washed in alcohol, and redissolved and crystallized, to free them from adhering sesquioxide. This done, they are of a light green color, sweetish ferruginous taste and quite deliquescent, so that if not used immediately for solution, they should be transferred to hermetically sealed bottles. For the preparation of Bestucheff's Tincture I use the following proportions:

Crystals of sesquichlor. iron,	. . .	2 ounces.
Spirit of wine, rect.	. . .	16 "
Sulphuric ether,	. . .	8 "

Dissolve, filter, and expose in white glass vials for forty-eight hours to the direct rays of the sun, or until it becomes colorless. It will be seen that six drachms of the above tincture contain thirty grains of the dry sesquichloride, which is nearly double the strength of the officinal tincture.

It now remains to point out the only objection which may be urged against it, namely, that in the absence of strong light it gradually deposits a brownish precipitate of sesquioxide, which somewhat detracts from the elegance of its appearance. To prevent this, I have undertaken some experiments, which, if successful, will be communicated.

Meanwhile, I will add, that the exposure of the vial containing it to the full rays of the sun for a few hours, will always cause a resolution of the precipitate, and restore the transparency of the tincture.—*American Medical Gazette*, August, 1857.

ROTTLEA TINCTORIA AS A REMEDY FOR TAPE WORM.

By DR. THOS. ANDERSON, Ass. SURG.

The *Rottlera tinctoria* is a species of euphorbiaceous plant found in the hilly parts of India, as along the base of the Himalayas from Assam to near Peshawur, in Central India, at the Northern Cercars, in Mysore, and at Parell Hill, near Bombay. In its habit it is almost arborescent, growing to twenty or thirty feet high. The substance called kamila, obtained by brushing the powder off the capsules of this plant, has long been known in India as a dye, and it is also occasionally used by the natives

as a vermifuge; this latter property is supposed by Dr. Royle to depend upon the stellate hairs found in the powder. Dr. Anderson mentions that his attention was first called to the medicinal properties of this substance by Dr. Gordon, of the 10th Regiment, who had met with great success in employing it as a remedy for tape worm. Dr. Anderson afterwards employed it himself for the expulsion of the same parasite in the case of several men of his own regiment. The powder is of a dark brick-red color, with a peculiar heavy odor, increased on its being rubbed between the fingers. Its physiological action is very simple: on an adult the powder in a dose of ʒij or ʒss , besides purging, very often causes nausea and vomiting, and in some cases griping; its action on the bowels, however, is very variable, producing from four to ten or fifteen stools even when a dose of ʒij has been administered. A strong ethereal or alcoholic tincture, besides acting more mildly, is followed by more uniform effects. Dr. Anderson found that an amount of the tincture sufficient to produce the full anthelmintic effect of the drug was never followed by more than six stools, and always acted without griping. After ʒij of the powder have been administered, the worm is usually expelled in the third or fourth stool. It is generally passed entire, and almost always dead, and in about fifteen cases examined by Dr. Anderson he was unable to detect the head. The vermifuge properties of *rotlera tinctoria* have been attested in a large number of cases. Dr. M'Kinnon has mentioned sixteen successful cases in a paper published by him, and he has since administered the powder to nearly fifty patients, out of whom there were only two cases in which no worm was expelled. Dr. Gordon has tried the remedy in thirty cases of tapeworm with uniform success. The dose of the powder of the kamila which seems to act most satisfactorily is ʒiiss to ʒij in an adult; and ʒss of the alcoholic tincture is the dose which is followed by the most successful effects.—*American Journal of Med. Sciences, from Indian Annals of Med. Sc., Oct., 1856.*

TRANSFORMATION OF AMYGDALINE INTO HYDROCYANIC ACID WITHIN THE BODY.

Professor Kölliker, and Dr. Müller, of Würzburg, have arrived at the following results from a series of experiments: 1. Amygdaline and emulsine introduced separately into the circulatory system by different channels, form prussic acid in the blood. 2. When the quantity of these substances is sufficiently large death soon occurs; it takes place more slowly with weaker doses. When amygdaline is first injected into the blood, and emulsine an hour afterwards, death speedily occurs. 3. When emulsine is first injected, and amygdaline forty-five minutes afterwards, death is retarded. Is the emulsine changed in the blood, or rapidly excreted? 4. Poisoning is not produced by injecting amygdaline into the blood, and emulsine into the alimentary canal. The emulsine, therefore, does not pass from the blood into the digestive canal, at least not without some change; on the other hand, it is not found in the intestines on post-mortem examination. 5. When emulsine is injected into the blood, and amygdaline into the intestines, poisoning occurs, though slowly. Death has been produced by introducing amygdaline into the digestive canal of rabbits, without any emulsine. The intestines of these animals, contain a ferment, capable of converting amygdaline into prussic acid. 6. Amygdaline injected into the veins, or into the intestines, passes off in large quantities, sometimes rapidly by the urine; some experimenters, as Wöhler and Frerichs, have not found amygdaline with certainty in this excretion; others, as Ranke, suppose it to be converted into formic acid.—*British and Foreign Med.-Chir. Rev., from Allgem. Medicin. Central. Zeitung.*

PRELIMINARY NOTE ON THE TANNIN OF GALLS.

By F. ROCHLEDER.

The author long since stated, that the treatment of certain organic substances with boiling alkaline solutions in an atmosphere of hydrogen furnished a good means of breaking them up. This process has been applied by Kawalier, in the author's

laboratory, to various substances. Several bodies which furnish crystallized sugar when treated with dilute acids with the aid of heat, also furnished this sugar when treated in this way with alkalies; thus, for example, a yellow crystallized substance from twigs of *Thuja occidentalis* may be decomposed by alkalies, as also by acids, in hydrogen gas, into well-crystallized grape-sugar, and a yellow crystalline body, similar to quercetine, which acquires a beautiful bluish-green color with ammonia. The author has also induced Kawalier to submit the tannin of galls to this treatment. In this way is obtained gallic acid, which may easily be procured pure by this process, and an amorphous yellowish body, of a somewhat bitter and acid taste, similar to gum-arabic, which on analysis gave numbers corresponding with the formula $C^{12}H^{11}O^{11}$. From about 150 grms. of tannin, not 1 milligram. of sugar was formed. The fluid freed from gallic acid reduced no trace of protoxide of copper from Fehling's fluid. Further experiments, which Kawalier has commenced with larger quantities of tannin, will serve to determine the atomic weight of the amorphous body.—*Chem. Gaz. June 15, 1857, from Sitzungsber. der Akad. der Wiss. zu Wien.*

Varieties.

The Gums and Resins of Commerce. By P. L. SIMMONDS.

(Concluded from page 379.)

A resinous gum called Alkor Lek (whence the word lac), flows from the *Pistacia Terebinthus*, Linn., in Algeria, which, mixed with other ingredients, is given as a purgative for fowls. It is supposed that this tree would yield good terebinthine. The gum flows so abundantly, even without incision, that it is often dangerous to sleep under the trees.

Under the commercial name of DRAGON'S BLOOD, the produce of several species of *Dracæna* is imported to the extent of about 100 packages of 1 to 2 cwt. each. In commerce the resin occurs in powder, grains, masses, drops of the size of an olive, and in sticks enveloped in the leaf of the talipot palm. Its chief use is for coloring artificial tortoise-shell, and in paints, varnishes, sealing-wax, &c. It stains marble, especially if the stone be heated. The resin is used occasionally in medicine as a tonic and astringent, and also in opiates and dentifrices. Occasionally a brick red powder, known in the East as wurrus, has been passed off here for dra-

gon's blood. This is collected from the seed-vessels of a euphorbiaceous tree, the *Rottlera tinctoria* of Roxburgh, occurring in Arabia, Eastern Africa, and various parts of India. The Chinese esteem dragon's blood highly. It is obtained in Socotra, from the *Dracæna draco*, which is usually met with on the hills at the elevation of 800 to 2000 feet above the level of the sea. There are two kinds there, and the best is of a dark crimson color. Jacquin states that the lump dragon's blood is the produce of *Pterocarpus draco*, but this is very questionable. A common kind in the eastern bazaars is the produce of the red astringent fleshy fruit of the *Calamus draco*, or by incisions in the stem, or natural exudations from various parts of the plant. An inferior kind is obtained by boiling the fruits. In the Madras bazaars, dragon's blood ranges in price from £3 to £11 the maund of 82 lbs., according to quality.

Dragon's blood was the cinnabar of the ancient Greeks. In the time of Dioscorides the opinion prevailed that it was the indurated blood of a dragon; and other old authors tell us that the tree received its name from having the figure of a dragon upon the fruit.

A red juice flows from the wild nutmeg on incisions being made into the bark. This hardens into laminated resinous pieces, red and transparent, and forms a variety of the substance known in commerce under the name of dragon's blood. Professor Lindley states, on the authority of Endlicher, that a species of *Myristica*, of the Phillippines, yields a crimson juice, which is collected from incisions in the trunk, and used as a substitute for dragon's blood, under the name of Durgan.

The *Icica* tribe, lofty trees of South America, produce resinous exudations of value in the districts where the trees occur. Of these I have specimens here in the Carana and Tacamahaca resins; and the resins of Perama, another dark resin from Central America. The *Icica Icariba* or *Amyris elemifera*, produces elemi, which resembles olibanum closely in its properties and uses.

ASPHALTE is manufactured at home by one or two companies to the extent of two or three thousand tons per annum. Small imports are received from America and the Continent for the use of varnish-makers, but as it does not appear in the trade returns, it is probably included with pitch, of which we receive about 300 to 350 tons yearly. But little of the genuine Egyptian asphaltum is now to be met with. There is one prolific source of asphaltum from which little commercial benefit has yet been derived, at least to the extent to which it is susceptible, and that is the Pitch Lake of Trinidad, covering a surface of about a mile in length by an eighth in width. Though the surface is generally too firm to receive a foot-print—just hard enough to cut readily with an axe—there are places where the pitch oozes out in nearly a liquid form. But the pitch is not confined to this locality. There are masses of it extending wider inland, and in several points it reaches to the sea-beach, whence it is shipped in large quantities to America, and some of the West India Islands, to use in

building and flagging streets. Near the Lake some of the negroes occupy themselves in boiling down the pitch, some of which is shipped in a pure state, and some, with the addition of lime, exported as mastic. Many hundreds of tons have been thus taken from the lake, to the depth of about a foot below the surface. The hole is always filled again within two days after the cutting, by the upheaving of the mass. It appears as though billions of tons of pitch had boiled up from the bowels of the earth, from the effects of an immense subterraneous fire, which had been extinguished, and left the asphaltum to cool in enormous bubbles.

Various attempts have been made to apply the inexhaustible store of bitumen afforded by this lake to some useful purpose. It is the best substitute for macadamization yet discovered. Mixed with sand and pebbles it is much used for pavements and the ground floors of houses at the town of Port-au-Spain, a purpose for which it is admirably adapted. The late Sir Ralph Woodford, when governor of the island, tried to obtain carburetted hydrogen gas from it to light a beacon on the tower of Trinity Church. It burnt well, but created such an intolerable stench, that the experiment was obliged to be abandoned. The person entrusted with the trial, however, knew nothing of chemistry. It has been employed to advantage as fuel by the American steamers plying on the Orinoco. It is thrown in the furnace among the wood, fusing too readily to be used alone.

With ten per cent. of resin oil it forms an excellent pitch for vessels. It was used for this purpose so far back as 1593, by Sir Walter Raleigh, who tells us that this substance was then in general use by the various tribes of Indians in the river Orinoco for caulking their canoes. It has been recently coming into use in the manufacture of petroleum. It might, I should suppose, form a base for some of the compressed artificial fuels.

The Earl of Dundonald has long had great faith in its ultimate commercial utility. Twenty or thirty years ago he shipped two cargoes of it to England, but it was found then to require too much oil in order to render it useful. Lately his lordship has purchased a large tract of the pitch lands, including twenty-six acres of the lake, and has instituted various experiments with the view of substituting the bitumen for India rubber and gutta-percha in the manufacture of water-proof fabrics, covering of telegraph wires, &c. Judging from the specimens of those shown by his agent at Port-of-Spain (Mr. C. F. Stollmeyer), these efforts bid fair to be quite successful. It seems only necessary that the same amount of intelligent enterprise should be directed to the subject in order to render this wonderful reservoir of bitumen a source of great individual profit and of essential service to mankind. If it could be brought into extensive commercial use for pavements and for the ordinary purposes of pitch and tar, Trinidad could easily furnish supplies for the whole world. Persons desirous of information connected with this lake will find good accounts in

the *United Service Journal* for January, 1839, by Dr. Thomas Anderson ; in Martin's "West Indies," vol. i. p. 191 ; by Mr. Alex. Anderson, quoted in M'Callum's "Travels in Trinidad," originally given, I believe, in "Transactions of the Royal Society," vol. lxxix. p. 65, and in *Fisher's Colonial Magazine*, vol. iii. p. 43 and 426. The most recent and best account will be met with in a paper by Mr. N. S. Manross, in *Silliman's American Journal of Science and Art*, vol. xx. p. 153 (No. for September, 1855).

The ELASTIC GUMS are among the most important and generally useful that come into commerce, and although at present confined to two varieties, there is no reason why additions should not be made to the list, and investigation promoted to elicit the comparative value of others. The rapid progress of the submarine telegraph, setting aside other important commercial uses of gutta percha, loudly calls for fresh supplies. If no other purpose had been subserved by this Indian gum than that of encasing the telegraph wires, mankind would have reason to be eminently grateful to the discoverers, and to the Society of Arts for the reward and publicity given to its merits.

We can all recollect when the only uses to which india-rubber was applied, was to rub out pencil marks, and make trap-balls for boys, but now it is made into shoes and hats, caps and cloaks, foot-balls and purses, ribbons and cushions, boats, beds, tents, and bags ; into pontoons for pushing armies across rivers, and into camels for lifting ships over shoals. It is also applied to a variety of other uses and purposes, the mere enumeration of which would be tedious. New applications of it are indeed continually being made.

Boundless forests of the Serang tree are found upon the banks of the Amazon, and the exportation of this elastic gum from the mouth of that river is daily becoming a business of more and more value, extent and importance.

Already within the past five years we have doubled our imports from Brazil (besides the large quantities which the United States draw from thence), and we have also increased our supplies of this elastic gum from the East, the imports from Singapore having risen from 559 cwt. in 1849, to 3030 cwt. in 1853.

Of substances which may be used as substitutes to some extent for caoutchouc or gutta percha, the inspissated juices of the jack fruits and trees, those from the wild and cultivated bread fruit trees, and the lola tree may be mentioned.

Various species of Indian fig-trees, as *Ficus radula*, *elliptica*, &c., also furnish portions of the elastic gum of commerce. *Vahea gummiifera* likewise supplies caoutchouc. The *Urceola elastica* (which produces the Gintawan of the Malays,) abounds on the islands of the Indian Archipelago ; in Java it is called "bendud."

The concrete milky juice of the *Cryptostigeia grandiflora*—a handsome climber, common in the Madras Peninsula—has long been known to contain caoutchouc, but it has not yet been collected for the purposes of commerce, and it is doubtful if a sufficient quantity could be obtained to render it an article of trade. The milk from the cow tree appears to contain caoutchouc. It is supposed to be obtained from *Tabernaemontana utilis* of Arnot, or a species of *Brosimum*. On the river Demarara the Indians climb the rubber tree, tap the trunk, and as the gum exudes, rub it on their bodies till it assumes a sufficient consistency to be formed into balls.

Recent inquiry has shown that caoutchouc is furnished of good quality, by a large number of milky-juiced plants belonging to different families (*Sapotaceæ*, *Apocynaceæ* and *Euphorbiaceæ*). In the East, Assam now furnishes large quantities of india-rubber from *Ficus elastica*. Complaints are, however, made of the want of care in the preparation of the article from Assam.

If the previous purifying of the gum be properly attended to—and in this process the whole art of manufacturing the perfectly elastic gum of commerce seems to exist—the gum should not, by any exposure to the atmosphere, be subject to the least degree of clamminess or viscosity; and if this important point be not fully attained, the article is of no use in the manufacture of those fine elastic threads which constitute its chief value in the European markets. The art of obtaining this complete freedom from clamminess, and consequent perfect elasticity, does not appear by any means to have been reduced to a certainty; and, consequently, a far better acquaintance with the article than is yet possessed by the Assam manufacturers seems requisite before it can be obtained with constantly the same results.

A substance resembling caoutchouc was said to have been obtained in Sierra Leone from a plant of the Euphorbia tribe, so long ago as Tuckey's voyage up the Congo, in 1816. Some large forest trees, belonging to the Sapotaceæ family, which abound at the foot of the Ghauts, N. E. of Trevan-drum, furnish a valuable elastic gum, called by the Malays pauchouthee, which bears a strong resemblance to gutta percha both in external appearance and mechanical properties, and the real *Isonandra gutta*, would appear to be common in the forests of the Neilgherries.

GUTTA PERCHA has been discovered in the British province of Mergui, and though not precisely identical with the gutta percha of commerce, it possesses all the valuable properties of that substance, including plasticity in hot water, and the power of insulating electric currents.

The tree from which the true gutta taban is produced (erroneously mis-named in Europe gutta percha, a gum yielded by a different tree), is one of the most common in the jungles of Johore and the Malay Peninsula. It is not found in the alluvial districts, but in undulating or hilly ground. There is a great uniformity in the size of the full grown tabans, which rise with perfectly straight trunks from 60 to 80 feet in height, and from 2 to 3

feet in diameter, the branches being few and small. The natives, after felling the tree, make an incision round it, from which the milk flows. This is repeated at distances of 6 to 18 inches along the whole trunk. It appears that the taban, or milky juice, will not flow freely like dammer and caoutchouc, but rapidly concretes. Its appearance in this state before being boiled is very different from that of the article as imported into Singapore, and then shipped to Europe. It has a dry, ragged look, resembling shreds of bark, and instead of being dense and tough, is light, and possesses so little cohesion that it is easily torn in pieces.

Various statements are made as to the produce of each tree, which is somewhat surprising, considering the uniform size of the trees. The extremes mentioned are two catties and fifty catties. Dr. Oxley takes the average yield at ten catties, but probably five would be nearer the mark, hence it would take twenty trees to produce one picul of gutta, or 133 lbs., and as the exports of gutta percha, from the commencement of the trade up to the close of 1853, have amounted to 3107 tons, it follows that upwards of one million trees must have been destroyed to obtain that quantity in nine years. The natives, however, do not appear to be under any apprehension that the trees will be extirpated, and smile at the probability when suggested, for it is only trees arrived at their full growth, or at least at a very considerable age, that repay the labor of felling them and extracting the gutta, and those of all inferior ages which are therefore left untouched, will, it is supposed, keep up the race.

The collection of the gutta has widely extended, embracing now the Johore Archipelago, Sumatra, Borneo, and Java. Unfortunately, the quality has deteriorated by the admixture of gutta percha, jelotong, gegrek, litchin, and other inferior gums, the products of different trees, which are often used to adulterate the taban.

The Gitah Lahoe is the produce of *Ficus cerifera*, Blume, which promises to be of great importance in an industrial point of view. The natives of Sumatra form torches of it, which burn with a clear flame, but make a great deal of smoke. A hydro-carbon, closely resembling Cullemundoo gum, from Jaulhna, was shown this year at Madras obtained from *Euphorbia tirucalli*. It differs considerably from caoutchouc or gutta percha in its physical qualities.

The milky juice of the Muddar plant of India (the *Asclepias* or *Calotropus gigantea*), gradually dries and becomes tough and hard, like gutta percha. It thrives on the poorest soils, and also furnishes an excellent fibre, useful in the place of hemp and flax.

The juice of the sappodilla plum tree, the *Achras sapota* of the West Indies and South America, is slightly adhesive to the touch, but it differs from gutta percha by becoming adhesive and extremely glutinous after being immersed in boiling water, while gutta percha immediately on exposure to a cooler temperature regains its original toughness and flexibility.

An elastic gum resin from an Australian *Ficus* was shown at Paris in the New South Wales collection, in small tears, of a dingy appearance, which might prove useful. A large portion dissolves in warm linseed oil, but spirits of wine does not act readily on it. By mastication it becomes tenacious and bleaches thoroughly.

The Royal Patriotic Society of Havana endeavored to introduce the cultivation of the *Ficus elastica*, and other elastic gum-yielding plants, into the Island of Cuba, but their efforts seem not to have succeeded.

The Cullemundoo gum attracted particular attention in 1851, and the exhibitor was rewarded with a prize medal, from the impression of its adaptability to various purposes in the arts. It is obtained from the *Euphorbia antiquorum* of Roxburgh, and this year, at the local exhibition at Madras, the products of two other species, *E. tirucalli* and *neurifolia*, received honorable notice, although the substances differed in their physical qualities from the true elastic gums of commerce.

An examination of the inspissated gum elastic juices of a number of trees from different localities, and prepared in a different manner, renders it probable that there are a variety of similar vegetable products yet untried, which may be advantageously introduced into commerce. They certainly deserve to be brought specially under the notice of our manufacturers, though as yet many of them are almost unknown to the very natives of the places in which they are prepared. Gutta trap, the inspissated sap of an *Artocarpus*, obtained on the Island of Singapore, and used for making birdlime, was favorably mentioned by the Jurors in 1851.—*Journ. Frank. Inst. from Jour. Soc. Arts, London, 1855.*

NOTICE

To the Pharmacutists and Druggists of the United States.

The Sixth Annual Meeting of the American Pharmaceutical Association will be held in the city of Philadelphia, on Tuesday, 8th of September ensuing, at 3 o'clock, P. M., in the Hall of the College of Pharmacy, Zane street above 7th.

The object of the Association, and the conditions of membership, are explained in the following extracts from the Constitution.

ARTICLE I.

1st. To improve and regulate the drug market by preventing the importation of inferior, adulterated or deteriorated drugs, and by detecting and exposing home adulteration.

2d. To establish the relations between druggists, pharmacutists, physicians and the people at large, upon just principles, which shall promote the public welfare and tend to mutual strength and advantage.

3d. To improve the science and the art of Pharmacy by diffusing scien-

tific knowledge among apothecaries and druggists, fostering pharmaceutical literature, developing talent, stimulating discovery and invention, and encouraging home production and manufacture in the several departments of the drug business.

4th. To regulate the system of apprenticeship and employment so as to prevent, as far as practicable, the evils flowing from deficient training in the responsible duties of preparing, dispensing, and selling medicines.

5th. To suppress empiricism, and as much as possible to restrict the dispensing and sale of medicines to regularly educated druggists and apothecaries.

ARTICLE II.—*Of the Members.*

SECTION 1. Every pharmacist and druggist of good moral and professional standing, whether in business on his own account, retired from business, or employed by another, who, after duly considering the objects of the Association, and the obligations of its Constitution, is willing to subscribe to them, is eligible to membership.

SECTION 2. The mode of admission to membership shall be as follows: Any person eligible to membership may apply to any member of the Executive Committee, who shall report his application to the said committee. If after investigating his claims they shall approve his election, they shall, at the earliest time practicable, report his name to the Association, and he may be elected by two-thirds of the members present on ballot. Should an application occur in the recess, the members of the committee may give their approval in writing, which, if unanimous, and endorsed by the President, shall constitute him a member, and the fact be reported to the Association at the next succeeding meeting.

SECTION 4. Every member shall pay into the hands of the Treasurer the sum of two dollars as his yearly contribution, and is liable to lose his right of membership by neglecting to pay said contribution for three successive years. Members shall be entitled, on the payment of three dollars, to receive a certificate of membership signed by the President, Vice-Presidents and Secretary, covenanting to return the same to the proper officer on relinquishing their connection with the Association.

SECTION 5. Every local Pharmaceutical Association shall be entitled to five delegates in the annual meetings, who, if present, become members of the Association, on signing the Constitution, without being ballotted for.

GEO. W. ANDREWS, President.

Baltimore, May, 1857.

Minutes of the Maryland College of Pharmacy.

Baltimore, April 2d, 1857.

The College met, and in the absence of the President, the first Vice President took the chair.

In the absence of the Secretary, Mr. J. F. Moore was appointed Secretary pro tem, and upon calling the roll twelve members answered to their names.

The Committee on plate of certificate for Contributing Members, reported the certificate printed and in the hands of the Treasurer for distribution.

Some remarks were made by Prof. Grahame on Tincture of Veratrum Viride, urging the propriety of the College adopting uniform formulæ.

After some discussion, on motion of Mr. Moore a Committee of three was appointed to investigate the subject and report a formula at the next meeting. The Chairman appointed Messrs. Moore, Phillips and Rogers, said Committee.

No other business being brought before the College, on motion adjourned.

MINUTES OF THE BOARD OF TRUSTEES.

Baltimore, April 2d, 1857.

The Board met after the adjournment of the College, six members present. Mr. Baxley made some remarks on the impropriety of members of the College advertising their membership on Circulars, &c., and on motion of Mr. Phillips a Committee was appointed to see what action, if any, the College should take in the matter, and report to the next meeting of the Board. Mr. Phillips was appointed said Committee. Mr. Grahame made some remarks on the propriety of making an arrangement for clerks in wholesale stores to attend the lectures of the College, and granting them some diploma or certificate; after considerable discussion it was referred to a committee of three, who were instructed to report to the next meeting. Messrs. Moore, Baxley and Sharp were appointed said Committee. On motion adjourned.

MINUTES OF THE COLLEGE.

Baltimore, March 7th, 1857.

The College met, and in the absence of the President, the first Vice President took the chair.

The Committee to whom was referred the formula of Mr. W. S. Thompson for Powdered Blue Mass, reported as follows: "That after trial with several modifications of the process given by him, we found the following to produce the most satisfactory result. Take of well prepared blue mass any convenient quantity, mix it with eight or ten times its weight of water of a

temperature not exceeding 150° Fah., put the mixture aside for subsidence, pour off the supernatant liquid and add to the residue about the same bulk of cold water as at first; let it stand as before, till complete subsidence occurs. Repeat the washings three times. Transfer the washed mass to an evaporating dish, and by means of a water bath dry it thoroughly. With the dried mass thus obtained mix a sufficient quantity of finely powdered starch and sugar of milk in equal proportions to make up the original weight of the mass, and triturate until the powder assumes a homogeneous appearance. It will be observed that the only variation from the formula by W. S. Thompson, consists in the substitution of sugar of milk for sugar, and in advising less frequent washing, we having found that too frequent washing caused the separation of the mercury in globules."

Signed

ISRAEL J. GRAHAME,
A. P. SHARPE.

Mr. Phillips, from the committee on Essays, etc., read a paper embodying rules and regulations, for the guidance of said Committees in the discharge of their duties, which was concurred in.

Mr. Phillips gave notice of an amendment to the By-Laws which he proposes to offer at the next meeting; to be appended to Sec. 5th of Article 6th, as follows: "The publication of the certificates of membership as a business advertisement is deemed inconsistent with the spirit of the Code of Ethics." The committee appointed at the last meeting to report a formula for Tincture of Veratrum Viride recommend the following formula:

Take of Root of Veratrum Viride	8 oz.
Alcohol 80 per ct.	Oj.

To be prepared either by displacement or maceration. After some discussion the formula was adopted. On motion adjourned.

MINUTES OF THE COLLEGE.

Baltimore, June 4th, 1857.

The College met, and in the absence of the President and both Vice Presidents, Mr. Roberts was on motion requested to take the chair.

The amendment to the By-Laws, offered by Mr. Phillips at the meeting in May, was on motion ordered to lie over until the July meeting. No other business having been brought before the meeting, the College adjourned.

MINUTES OF THE BOARD OF TRUSTEES.

Baltimore, June 22nd, 1857.

The Board met, and was called to order by the First Vice President. Present, Messrs. Grahame, Baxley, Sharpe, Roberts, Moore and Thompson.

On motion the Board went into an election for Professors for the ensuing year. Whereupon, Messrs. Steiner, Frick and Grahame, were nominated and unanimously re-elected. On motion adjourned.

MINUTES OF THE COLLEGE.

Baltimore, July 2nd, 1857.

The College met, and in the absence of the President, the Vice President took the chair. Upon calling the roll, fourteen members answered to their names. This being the regular meeting for election of President, Secretary, Treasurer, and one of the Board of Examiners, Geo. W. Andrews was elected President, J. Faris Moore, Secretary, J. B. Baxley, Treasurer, and Charles Caspari, one of the Board of Examiners.

A communication was received from Dr. Monmonier, on the part of the Medical and Chirurgical Faculty of Maryland, proposing to rent a room owned by them, No. 27 North Calvert Street, for the use of the College. After some discussion, on motion of Mr. Smith, the whole subject was left with the Board of Trustees, to act at their discretion. The amendment of Mr. Phillips, to be appended to Section 5, of Article 6th, of the By-Laws, was brought up, and after considerable discussion was on motion laid on the table. On motion of Mr. Roberts, the resolution to lay on the table was reconsidered, when Mr. W. S. Thompson offered the following substitute.

Resolved, That we discountenance the publication of the certificate of membership, as an advertisement in connection with Patent Medicines, or Proprietary articles. Which was adopted.

The Treasurer's account for the past six months, was read as follows:—

Balance on hand as per January report,	\$3.26
Amount received from January 1st to June 31st,	302.00

Total,	\$305.26
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Disbursements for the same period, as per vouchers,	249.21
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Balance on hand July 1st, 1857,	\$56.05
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On motion a Committee of three was appointed by the Chairman, to examine the account.

N. H. Jennings, Jas. W. Bowers and Edwin Eareckson, were appointed said Committee. On motion adjourned.

MINUTES OF THE BOARD OF TRUSTEES.

Baltimore, July 6th, 1857.

The Board met, and was called to order by the Vice President. Present, Messrs. Grahame, Phillips, Baxley, Sharp, Caspari and Moore.

J. Faris Moore offered his resignation as one of the Board of Examiners, which was accepted. On motion, Joseph Roberts was elected to fill his place. On motion the Board adjourned.

MINUTES OF THE BOARD OF TRUSTEES.

Baltimore, July 27th, 1857.

The Board met, and was called to order by the Vice President. Present, Messrs. Grahame, Baxley, Roberts, Caspari and Moore.

The Committee to whom was referred the subject of Clerks in wholesale stores attending the Lectures of the College, reported, and were continued.

Prof. Grahame read the contemplated circular for the Lectures of the next session for the approval of the Board. On motion the Board approved of the circular, and ordered 400 copies to be printed.

On motion the Board adjourned.

MINUTES OF THE COLLEGE.

Baltimore, August 6th, 1857.

The College met, the 1st Vice President in the Chair.

Mr. Sharp offered a formula for Anodyne Plaster, which, on motion, was ordered to be placed on the Minutes, as follows:

R. Lead Plaster,	-	-	-	-	-	3x.
Gum Elemi						
White Wax aa.	-	-	-	-	-	3j.
Rosin,	-	-	-	-	-	3ss.
Dragon's Blood, (in powder,)	-	-	-	-	-	3ij.

Melt together and add

Pulv. Myrrh,	-	-	-	-	-	3vj.
Pulv. Opil,	-	-	-	-	-	3ij.

And when nearly cold,

Pulv. Camphor,	-	-	-	-	-	3iss.
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Mr. W. S. Thompson made some remarks on the mode of preparing Syrup Rhei Aromat., recommending the following process: "Having reduced the ingredients to a coarse powder separately, make a tincture of the aromatics with a small portion of the diluted alcohol. Mix the dregs left after the displacement of the aromatic portion with the rhubarb and a sufficient quantity of washed sand, and displace with the remainder of the diluted alcohol. Proceed in the usual manner for making syrup, and when the process is nearly completed add the Aromatic Tincture, previously reduced by evaporation over a water bath to one half."

The Committee to whom was referred the Treasurer's account, made their report which was accepted.

On motion, the College went into an election for delegates to represent the College in the American Pharmaceutical Association, which meets in Philadelphia, in Sept. next. Upon counting the ballots, the following gentlemen were found to be duly elected: J. B. Baxley, J. F. Moore, I. J. Grahame, James W. Bowers and Joseph Roberts.

On motion, a Committee of two, of the delegates, was appointed to collect the annual contribution of the members of the National Association, who reside in this city, for the coming year. The Chairman appointed J. F. Moore and Joseph Roberts said Committee.

After some very interesting conversation on subjects connected with Pharmacy the College adjourned.

J. FARIS MOORE, Sec.

Editorial Department.

AMERICAN PHARMACEUTICAL ASSOCIATION.—In a few days this body will convene at the Hall of the Philadelphia College of Pharmacy, Zane st. above 7th, (Tuesday, Sept. 8th, at 3 o'clock P. M.,) where preparations are being made for its accommodation. Having already, on several occasions, urged the propriety of our distant brethren straining a point to get to the meeting, we now turn to those nearer home, and at home. Owing to the fact that the Association has not met here since its original organization, in 1852, there are fewer members from this city than from almost any other where it has been called together. It is therefore expected that among the reputable pharmacutists of Philadelphia and its vicinage, many will seek to ally themselves to the Association, and thus lend their aid to a movement which eventually is calculated to effect great and useful reforms in the practice of Pharmacy, and in the trade in drugs. Philadelphia has always taken a prominent part in such movements, and we wish to see her pharmacutists enter heartily into the cause advocated and represented by the body about to convene, viz: "The advancement of Pharmaceutical knowledge, and the elevation of the professional character of Apothecaries and Druggists throughout the United States." As the reading of scientific papers and the discussions of subjects relating to the business of pharmacutists is an important part of the business of the meeting, there will doubtless be much to interest those in attendance.

PHILADELPHIA COLLEGE OF PHARMACY—THE SCHOOL OF PHARMACY.—Since the last session, the College, in view of the increased numbers in attendance, have fitted up a new and larger room for the accommodation of the School of Pharmacy, in place of the lower room formerly occupied, which will now be used solely for the library, museum and meetings of the College and Board of Trustees. The new lecture room embraces the entire third story, and for convenience of arrangement, thorough ventilation and light, is the best room in the building. The second story lecture room has also been improved, and a small lateral room attached as a depository for apparatus, etc., pertaining to the chemical and pharmaceutical lectures. The Hall in the first story has been completely renovated, the staging formerly occupied by benches removed and the floor levelled, a small Committee room attached, and the vestibule increased in size, with lateral doors. The building has also been thoroughly painted, outside and in, and presents a much improved appearance.

The school of Pharmacy, as will be seen by reference to the announcement in our advertising columns, will be opened by a general introductory on

Friday evening, Oct. 2d, and continued on Monday, Wednesday and Friday evenings, until the 1st of March—two lectures on each evening. The lectures consist of three courses—on Chemistry, Materia Medica and Practical Pharmacy,—and are thoroughly illustrated with apparatus, specimens and diagrams, and no trouble is spared by the professors in rendering the subject as clear and lucid as possible. The conditions of graduation are appended to the advertisement.

DR. EDWARD R. SQUIBB. LOUISVILLE CHEMICAL WORKS.—Our readers have become familiar with the name of Dr. Squibb as the author of various papers which have appeared in this journal during several years past; during which period (and before) he has conducted the manufacturing department of the U. S. Naval Laboratory, at Brooklyn, in a highly satisfactory manner, and supplied to the navy the pharmaceutical preparations of the Pharmacopœia in a uniformly good condition. Notwithstanding the importance of his service, the emoluments of his office are limited to the small salary of Passed Assistant Surgeon. At his own request Dr. Squibb has been detached from the Naval Laboratory in order to accept the position, *temporarily at least*, of manufacturing co-partner in the firm of Thomas E. Jenkins & Co., of Louisville, Kentucky, which firm is about to establish, in connection with their drug business, a large manufactory of chemical and pharmaceutical preparations under the title of "Louisville Chemical Works." Prof. Smith, of the University of Louisville, is also a partner in the firm. Dr. Squibb will have charge of the manufacturing department of the works, and Mr. Jenkins the commercial department, leaving the financial department for Prof. Smith.

Located near the centre of the great valley of the Mississippi, the firm intend to seek their market chiefly west of the mountains, and as the pioneer establishment of this kind, out there, propose to adhere strictly to the Pharmacopœia in the purity of their preparations, on which condition only Dr. Squibb entered the firm, as he is well known as the uncompromising enemy of adulterated drugs and chemicals, come they from what quarter they may. We trust, with intentions so fair, they may meet success, and join our friends Powers & Weightman, Rosengarten & Sons and other houses, in developing the resources of this great country, and stopping the influx of foreign chemicals.

RESIN OF LIQUIDAMBER STYRACIFLUA.—Mr. Daniel Hanbury, in a letter to the editor, dated London, June 2, 1857, says in reference to this resin as follows:

"I thank you for the sample of liquidamber resin. The acid which it contains you will find to be *cinnamic*; it is easily extracted by boiling the resin with lime and water, filtering the hot liquor and allowing the cinn-

mate of lime to crystallize out. Upon decomposing the cinnamate with hydrochloric acid, the cinnamic acid separates in platy crystals; the process, in fact, is precisely that sometimes adopted in preparing benzoic acid.

From this acid, cinnamic is distinguished by heating it in a test tube or small flask, with solution of chloride of lime, when it evolves the odor of essential oil of bitter almonds (Hydruret of Benzule), while benzoic yields nothing of the sort. I have used this test repeatedly—in some cases when I have not had more than 30 grains of resin to operate upon. All products of *liquidamber* afford cinnamic acid. Benzoin yields none. Is it likely that the resin of *styrax officinale* will? I am using all my endeavors to obtain an authentic specimen of this last, in order to make trial whether it contains cinnamic or benzoic acid. I question whether even the *amygdaloid storax* is the genuine unmixed exudation of *styrax*: it certainly contains cinnamic acid."

This information from Mr. Hanbury appears to settle the long mooted question as to whether or not the acid in this resin is benzoic, and gives a very easy means of distinguishing that acid from the cinnamic.

PHARMACY IN AUSTRALIA.--By a recent number of the Pharmaceutical Journal, we are informed of the organization of a Pharmaceutical Society in Victoria, Australia. This speaks well for the progress of that distant but rapidly rising country, as the organization of apothecaries is one of the last of the processes that occur in the movements of communities. We trust it will be very successful, that it will foster science and be the means of developing much of interest, in reference to the productions of that island-continent hitherto covered with mystery. This is one of the legitimate fruits of that great home movement—the Pharmaceutical Society of Great Britain—than which we know of no more interesting object in the present aspect of the world of Pharmacy.

OBITUARY.—Baron Thenard, another of those great chemists who adorned and illustrated the first half of the nineteenth century, died on the 21st of June, at Paris, after a few days illness, in the 81st year of his age. Until a short period before his death, his health was so vigorous as to promise yet some years of usefulness.

Thenard was born during the epoch of the great discoveries of Lavoisier, Priestly and Cavendish. He was, says Boudet, the friend of Laplace and Berthollet, the cotemporary of Davy, Berzelius and Gay Lussac, the last of whom was his co-worker. He was a professor at the Sorbonne, to the College of France, and the Polytechnic school, and during half a century the historian and interpreter of modern chemistry; he was the devoted protector of true merit and industry in the young, always accessible and kind, and ready to render services to those who sought his aid. He was, at the

time of his death, Chancellor of the University, and one of the most prominent members of the Academy. His large work on Chemistry has long been one of the standard treatises in the science.

TILDEN & Co., OF NEW LEBANON.—We acknowledge the receipt of several specimens from these gentlemen, which were received too late for notice this number. Among them we find Wine of Wild Cherry, Podophyllin, Hydrastin and other items of their class, which present a favorable appearance.

THE DRUGGIST'S RECEIPT BOOK: Comprising a copious Veterinary Formulary, and tables of Veterinary Materia Medica, numerous recipes in patent and proprietary medicines, Druggist's Nostrums, etc., Perfumery and Cosmetics, Beverages, Dietetic articles and condiments, trade Chemicals, &c., with an appendix of useful tables. By HENRY BEASLEY. Third American edition, with numerous additions. Philadelphia. Lindsay & Blakiston. 1857. Pp. 495, 12mo.

This book is an *omnium gatherum* of recipes for various purposes in the arts, pharmacy, medicine, the treatment of horses and other animals, and the diseases of vines, fruit trees, etc., and in household economy, as preserving, pickling, and other processes of a dietetic nature. Every druggist and apothecary must have a book of this kind at hand for reference on many occasions where information is wanted out of the regular line of his business, and for this use we can recommend it as one of the best of its kind.

REPORTS OF COMMITTEES TO THE MASSACHUSETTS COLLEGE OF PHARMACY at the annual meeting, held March 2, 1857. Boston. Pp. 24. Octavo. This pamphlet has been received.

ERRATA.—Our readers will please insert the following line after the *last* line on the *first* page of the July number.

"ble subcarbonate if the acid be in the smallest degree deficient." It was accidentally put at the bottom of the 2d page.

Also, at page 222, line 32d, of the May number, instead of "Chloride of Sodium," let it read "Chloride of Calcium."